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ABSTRACT

A telephone survey of all 50 states and site visits to 18 states and one Canadian province were conducted in order to provide data for a comparison of California's space and utilization standards to those of other states. The scope of the study was limited to a review of the standards or guidelines for the following space categories: classrooms; teaching laboratories; research laboratories; and academic offices. The report presents both "raw" and normalized comparisons of the standards/guidelines used in the selected states. Among findings were that only half the states use formal space standards or guidelines in the planning and budgeting for higher education facilities and that most states have patterned their space formulas and standards after the original work done in California in the 1950s and 1960s. An appendix describes adjustments for differences in enrollment counting periods and adjustments for differences in time of day enrollment. Numerous exhibits supplement the text. (GLR)

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SURVEY OF SPACE AND UTILIZATION STANDARDS AND GUIDELINES IN THE FIFTY STATES

A Report of MGT Consultants, Inc.,
Prepared for and Published by the
California Postsecondary Education Commission

CALIFORNIA POSTSECONDARY EDUCATION COMMISSION
Third Floor • 1020 Twelfth Street • Sacramento, California 95814-3985

COMMISSION REPORT 90-4
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Executive Summary

The State of California faces substantial enrollment growth, potentially requiring the addition of several new higher education campuses. The existing space and utilization standards used for facilities planning were established in the late 1940s and mid-1950s and have not undergone a major review since 1966. Since then, only two formal changes have been adopted by the Legislature, one in 1970 and another in 1973, increasing the required hours of use per week for classrooms and teaching labs.

Anticipated enrollment growth, combined with limited financial resources available for new construction, has resulted in significant legislative interest in assuring that California's planning standards accurately reflect space needs. In 1985, the California Legislature directed the California Postsecondary Education Commission (CPEC) to review and evaluate the standards and recommend appropriate changes. After a preliminary study of science and engineering disciplines, CPEC determined that the subject's scope and complexity warranted a comprehensive review with assistance from an outside contractor. MGT was selected to work with CPEC and an advisory committee representing the three segments of public higher education and the executive and legislative branches. The study was conducted in three phases:

- Phase I - A national survey to compare California's space and utilization standards to other states;
- Phase II - A comparison of space inventory systems and room utilization study methods used by California's three segments of higher education; and
- Phase III - A review of changes, impacting space needs, which have occurred in specific disciplines since space standards were established.

This report presents findings from the national survey of space and utilization standards/guidelines.

Scope, Purpose and Definitions

Phase I of the study included a comprehensive review of the facilities budgeting practices of all 50 states. Four types/categories of space were included in the study:

- classrooms,
- teaching laboratories,
- research laboratories, and
- academic offices.

Planning standards for the health sciences, except in community colleges, were excluded from the study.

The purpose of Phase I was to compare California space and utilization standards to the standards/guidelines used in other states. Space standards/guidelines represent square footage allowances to estimate the need for broad categories of space rather than design guidelines which are applied to specific construction projects. A space standard/guideline refers to the number of assignable square feet (ASF) allowed per demand unit for a category of space, such as square feet per student for a classroom or teaching lab; square feet per graduate student for research activities; or square feet per faculty member for office space. A space standard/guideline normally includes space for storage and other support space. *Utilization* standards/guidelines refer to the expected number of hours available classrooms and teaching laboratories will be used each week and the proportion of student stations (the seats in the room) which are expected to be filled.

For classrooms and teaching laboratories, space planning factors are derived using both space and utilization standards/guidelines. A combination of assumptions as to the number of hours per week that rooms will be used and percent of student stations which will be occupied (the utilization components) and the size of the station (the space component), yields a space planning factor per demand unit, weekly student contact hour (WSCH), or student FTE.

No utilization assumptions (standards/guidelines) are applied in planning space for research laboratories or academic offices. Therefore, space planning factors for these categories of space are expressed normally in terms of space per demand unit, e.g., research assistant, FTE faculty, etc.

Methodology

The study included a structured telephone survey of all 50 states, the Province of Ontario and several independent colleges and universities. The purpose of the survey was to identify facilities budgeting processes and determine whether standards/guidelines for the four space categories were used. The telephone survey was followed by site visits to 18 states, four private universities and the Province of Ontario to learn the details of the capital budget processes in higher education systems where space standards/guidelines are widely accepted and used.

To provide meaningful comparisons, information obtained from the survey states was adjusted to normalize the data to California definitions and characteristics. Normalization was achieved by establishing three prototype state higher education systems similar, but not identical to, California's three higher education segments. The standards/guidelines from each state were then applied to the prototype systems to eliminate differences not attributable to the standards/guidelines, themselves.

The use of the three prototypes allowed calculations of classroom and teaching lab space factors, adjusted to:

- reflect discipline and student distributions of enrollment similar to that currently being experienced by the three higher education segments in California;
- reflect the academic year average enrollments used by California (versus the fall term, 12 month average and other enrollment counting periods used by other states); and
- include evening enrollments (versus the exclusion of evening enrollments by some other states).

For research laboratories and office space, where states' standards and formulas varied widely, the chosen unit of comparison was total ASF generated by the application of each state's standards/guidelines to the prototype systems. This simulation approach allowed comparisons of the total space generated by applying each state's formula to the same prototype systems.

The results of Phase I, presented in this report, represent the most comprehensive comparison of higher education space planning factors to be made since standards began being used.

Findings

From the national survey it was learned that:

- Twenty-five states use formal space standards/guidelines in their budgeting process, of which five states make only limited use of standards/guidelines.
- Only five state legislatures actively use standards/guidelines in making appropriation decisions.
- Most states pattern their space formula and standards after original work done in California in the 1950s and 1960s.
- Eleven states have updated their standards/guidelines in the last five years.

The review of standards/guidelines for classroom space indicates that:

- The formulas used by all states are similar, involving assumptions of the number of hours of room and station use per week and square footage allowances per station.
- The standards/guidelines used by seven states differentiate in their utilization or station size assumptions by either type or size of institution; California does not.
- California's space standards produce significantly less square footage per FTE student or weekly student contact hour than any of the survey states. This is the case for the community college system, state university system and research university system.
- The smaller square footage allowance per student or contact hour resulting from the application of California guidelines is due to the fact that California requires that classrooms be used

more hours per week than any other states. The California guidelines also allow somewhat less space per student station.

In the teaching laboratory category, the study found:

- All states estimate the need for teaching laboratories using a formula similar to that used for classrooms, except that the required number of hours of room use per week is lower than that in classroom formulas and expectations for station occupancy are higher.
- Most states apply space allowances per station for instructional laboratories that vary by discipline (e.g., biological sciences, engineering, etc.) and several states, including California, have space allowances that vary by type of institution and/or level of instruction.
- In the state university and research university comparisons, California space standards generate significantly fewer square feet per student (or contact hour) than most states due largely to more stringent utilization expectations.
- Although California utilization requirements for community colleges are higher than utilization guidelines in other states, the California space standards produce a somewhat larger amount of square feet per contact hour than most other states. This appears to be due to greater emphasis on occupational programs in California community colleges which is reflected in standards that provide the larger amount of space needed to carry out these programs.
- The standards/guidelines used by other states contain a specific allowance for graduate level teaching laboratory space in their research universities. State standards for the University of California do not provide a separate allowance for graduate level teaching labs. It is assumed that these space needs will be met by the allowances for research laboratories.

In the case of research laboratories:

- Only 13 of the 19 survey states have standards/guidelines for research lab space and the formulas used in those states vary substantially in terms of both demand factors and the discipline categories used.
- California's standards generate somewhat less research lab space than the majority of states and less than the average of the survey states.
- California standards do not specifically recognize grant and contract research personnel, such as post-doctoral fellows, as space demand factors.

The survey findings for academic office space indicate:

- A variety of demand factors are used by the states surveyed to generate allowances for academic offices and administrative support space for academic programs. These range from an allowance for office space applied to student enrollment to allowances per FTE faculty to allowances for each category of staff requiring space.
- In the case of the community college system and the state university system, the California standards generate a smaller amount of square feet than any of the survey states.
- For the research university system, the ASF produced by California standards are below the average of the survey states. California ranks thirteenth of seventeen in this category.

Original work by the states to develop methodologies, formulas and standards/guidelines for use in capital budgeting were based on the predominant characteristics of higher education in the 1950s.

Since then, the majority of states have updated their standards/guidelines and, in some cases, have made major revisions to reflect changing educational program needs. Based on findings from this national survey, an important issue facing California and many other states is the need to ensure that the impact of changes in mission, technology, program needs and external health and safety requirements are taken into account in the standards/guidelines used for capital budgeting.

1 Introduction

The State of California has been one of the leaders in developing an organized approach to facilities planning and capital budgeting. In 1947, the California Legislature, anticipating the post-World War II enrollment boom, authorized a comprehensive study of higher education facility needs. This study led to the "Strayer Report," which outlined objective space and room utilization standards for capital development. Subsequent efforts, including the 1955 restudy by McConnell, et al. and the standards developed by the Coordinating Council for Higher Education (CCHE) in the mid-1960s, produced "state of the art" criteria and guidelines. Although complete agreement was not achieved among all parties, the standards provided an objective base for capital planning and budgeting in a period of rapid growth.

During the period of the 1960s and early 1970s similar efforts were made by other states and by the National Center for Higher Education Management Systems (NCHEMS). Unfortunately, however, only limited standardization was achieved, and NCHEMS' attempt to develop a definitive system fell short of its goal. As a result, states have developed their own systems, with differing bases and definitions, to meet their unique needs and work within their own political environment.

During the late 1970s and early 1980s there have been only a few efforts to build on earlier work. Slower enrollment growth and funding restrictions reduced the emphasis on studies in this area. The decision of the National Center for Education Statistics to discontinue the collection of facilities information resulted in less available data on which to base changes.

California higher education is now facing a new set of challenges in planning for the future. Demographic changes indicate a pattern of substantial enrollment growth. Concern for the educational needs of "place bound" adults has increased pressure for extended services. Changes in technology and the approach to teaching and research has also produced continued pressure for facilities modifications. In addition, a need to renovate or replace many facilities built in the 1950s and 1960s is now emerging. Finally, the financial restrictions of recent years have resulted in increased pressure by state policy makers to re-examine existing space standards to determine their appropriateness.

1.1 Study Objective

In response to the above issues and concerns, the California Legislature directed, through Supplemental Language added to the 1985-86 Budget Act, that the California Postsecondary Education Commission (CPEC) conduct a two-part study of space and utilization standards. The first part of the study was limited to the disciplines of engineering, biological sciences, and physical sciences and resulted in the report *Time and Territory*, published by CPEC in 1986.

The following report is the result of the second part of the study and concentrates on presenting a comprehensive survey of the facilities planning practices in other states. The objective of this study is to provide a methodology and a data base to compare existing California space and room utilization standards to those used in other states.

1.2 Scope of Study

The scope of this study was limited to a review of the space and utilization standards or guidelines for the following categories of space:

- Classrooms
- Teaching Laboratories
- Research Laboratories
- Academic Offices

The study excluded consideration of space standards for the health sciences, except at the community college level. Data on facilities planning/budgeting processes and use of space/utilization standards or guidelines were obtained from all 50 states, selected private institutions and the University of Toronto in Ontario. This study compares formulas used by different states to estimate space needs for higher education. It is important to note, however, that the study was not designed to determine the adequacy or total amount of space actually available in California or the other states. The material presented in this report is based on information obtained from representatives of state higher education system offices, colleges/universities, and legislative/executive branches of government.

1.3 Overview of Methodology

The following general methodology was followed in conducting the study:

1. Telephone survey, using a prepared questionnaire, was conducted for all states and selected public and private universities to determine whether, and the extent to which, facilities standards and guidelines for the four subject space categories were used.

2. Based upon an evaluation of the telephone survey results, the 18 states, one Canadian province, and four private universities were chosen for on-site visits:

States

California
Colorado
Florida
Kansas
Maryland
Nebraska
New Hampshire
New Jersey
New York
Oregon
Oklahoma
Ohio
Tennessee
Texas
Utah
Virginia
Washington
Wisconsin

Province

Ontario

Private Universities in Other States

Harvard
MIT
Yale
Brigham Young

3. Two types of questionnaires were developed for use in the on-site surveys:

   (1) A detailed data collection survey instrument designed to gather all of the information necessary to compare each state's standards to those of other states.

   (2) An opinion survey instrument designed to determine the level of use and confidence in the standards and guidelines by the various decision making groups in each state (e.g., institutions, state system offices, Governor's offices, and legislative houses).

4. The survey instruments were pilot tested in California, Florida, Washington, and Oregon. Appropriate changes were made to ensure the collection of accurate information.

5. The following surveys were conducted with representative individuals in the 18 states and Ontario:

   - *Data Collection Survey:* Conducted with the officer responsible for overseeing the higher education facilities budgeting system.
   - *Opinion Surveys:* Conducted with (as appropriate):

     State System Office
     Governor's Office
     House
     Senate
     One of each type of public higher education institution in the state.

6. Four large private universities were visited in the field survey process: Brigham Young, Harvard, M.I.T. and Yale. Although all but Harvard used guidelines in the facilities planning process, they were related to the unique environment of the institution and were not analogous to those used at the state or provincial level. Therefore these institutions have not been included in the comparative analyses in this report.

7. A normalization methodology was developed to achieve comparability among the states and province for the four categories of space. The methodology consisted of:

   - The establishment of three prototype state higher education systems to establish a common base for comparing each state's standards/guidelines. The three prototype systems are:

     (1) Community College System

     (2) State University System

(3) Research University System

- The application of each state's facilities standards/guidelines to applicable prototype systems.
- The identification and measurement of additional adjustments necessary to achieve comparability.
- The combination of all adjustments to derive a single set of comparable, normalized factors among the states.

1.4 Summary Description of Report

This report provides a description of the findings and conclusions of both the state telephone and onsite surveys. We have attempted to provide enough information and data either in the body of the report or the appendices for an interested reader to replicate our analyses to verify the findings or to develop alternative methodologies.

The report presents both "raw" and normalized comparisons of the standards/guidelines used in the selected states. Raw data comparisons are referred to in exhibits as "Unadjusted." The presentation of both types of comparisons are intended to aid the reader's understanding and appreciation of the different budgeting standards and processes utilized by the states.

The entire report consists of:

(1) Comparison of the Higher Education Facility Standards/Guidelines Among the States (Volume I), including Appendix A: Adjustments for Differences in Enrollment Counting Periods; and

(2) Calculation of Base Factors for Comparison Institutions and Study Survey Instruments (Volume II, bound separately).

2 Overview of Use of Space Standards and Guidelines in Other States

To identify those states with facilities budgeting methodologies that were potentially broad and detailed enough to contribute to this study, we conducted a telephone survey of all 50 states. In conducting the survey, we:

- used a prepared instrument designed to identify in each state:
  - whether standards existed for each of the four subject classes of space; and
  - whether the standards were actually being utilized in the budgeting process.

  A copy of the survey instrument is included in a separate volume (Volume II).

- used a set of prescreening questions to ensure that our telephone interview was with a professional who was actually involved in the higher education facilities budgeting process in each state. In most states, our interview was with the individual in the state higher education system/coordinating office responsible for facilities budgeting.

Prior to publishing the final report we also sent a working draft copy to each state representative for review and comment. Changes suggested by the reviewers have been incorporated in the report.

2.1 Overview of State/Province Facilities Budgeting Processes

The following sections provide a brief overview of the facilities budgeting process, with primary emphasis on whether space standards/guidelines are used, in each of the 50 states.

Note: The terms *space standards* and *guidelines* are used interchangeably to describe the planning factors used in budgeting for capital facilities.

The reader will note in the following paragraphs that, as with all ongoing decision-making processes, the facilities budgeting processes in several of the states are currently being altered. Where such changes are in process or are being contemplated we have attempted to note the direction of the change (e.g., updating of standards/guidelines, establishment of a new budgeting system that utilizes standards/guidelines, movement away from use of standards/guidelines, etc.).

Alabama

There are no standards or guidelines in use in Alabama. For budgeting purposes, utilization rates are compared to national and Southern Regional Education Board (SREB) averages. Institutions prepare capital budget requests and submit them to the Alabama Commission on Higher Education (ACHE). ACHE reviews and ranks the budget requests in priority order, based on utilization rates. Institutions are authorized to issue bonds. Debt service is provided through dedicated utility taxes and tuition and fee revenues.

Alaska

The University of Alaska uses space standards/guidelines in campus planning and capital budgeting. The standards apply to both the two- and four-year campuses of the University System and are accepted by the institutions and by the Governor's budget office.

The standards/guidelines are relatively new and encompass all the types of space under study. Classroom, teaching lab, and research lab standards vary by discipline while the two former categories vary by day and evening enrollments. Room size/type is taken into account in classroom standards. The standards assume different space availability factors for campuses with high evening enrollments. The University maintains a central data base of inventory and utilization data.

Alaska's capital program uses state general revenues, and appropriations to the system are in specific amounts for specific projects. The budget process is straightforward and involves the preparation of a consolidated request by the Regents, review by the Governor's budget office, and final action by the Legislature.

Arizona

Neither the Board of Regents nor the Community College Board use space standards/guidelines in capital budgeting. The Regents are just beginning to require the institutions to use some form of standards. Inventory and utilization records are kept by the universities.

There are four approaches to capital funding for higher education in Arizona: (1) Community Colleges receive formula amounts per Full-Time-Equivalent (FTE) student; (2) Universities share in a $14 million per year renovation and renewal program appropriated from general funds to the Regents which requires a 1/3 match from local funds and is based on a replacement cost formula; (3) major projects may be requested through the Regents which are funded from bonds backed by tuition and fees and indirect cost recoveries, and through lease-purchase arrangements; and (4) from university operating appropriations if the project is under $1 million. Community Colleges may also apply for direct project funding under a law passed two years ago. However, no funds have been appropriated under this option.

Arkansas

Arkansas does not have space standards or formulaic guidelines. Funds are granted to institutions for specific projects in specific dollar amounts. Each institution generates a capital outlay budget request. The Department of Higher Education reviews requests and sets priorities for expenditure. The requests go through the Governor's budget request to the Legislature.

Funding is provided primarily through state general revenue and dedicated tax funds. Institutions can issue general obligation bonds for Education and General (E&G) facilities and revenue bonds for auxiliary facilities.

Colorado

The State of Colorado makes extensive use of standards/guidelines in its capital budget process. The standards are most clearly evident in the preparation of the campus space master plan and the facilities program plan. The standards apply to both two- and four-year institutions and are utilized by the Colorado Commission for Higher Education (CCHE) in its review of capital plans.

The facilities standards were developed by the institutions with the aid of a consultant more than 20 years ago. They were updated as recently as 1982 and another review is scheduled soon. They are accepted by all parties in the capital budget process.

Classroom standards vary by room type while teaching lab allowances are sensitive to sub-discipline distinctions, thereby often reflecting course level differences. The institutional plans identify research positions, which are translated into resource space needs by discipline. Office space criteria vary by position level.

The central policy and coordinating agency (CCHE) plays a major role in the capital budget process with each institution and board required to develop an academic master plan and a facilities master plan. A facilities program plan is submitted to the CCHE which reviews for need and consistency with plans and assigns a priority to each project. The Commission then adopts a consolidated request and a rolling five-year plan. Requests go directly to the Governor, the Office of State Planning and Budget, and the Legislature. The Joint Legislative Committee on Capital Development prioritizes all state building needs.

After appropriations are made, the Commission plays a major role in the release of funds. Appropriations, primarily funded from lottery receipts, are made directly to institutions.

Connecticut

All Connecticut public colleges and universities use the same space standards for planning, building, project design, budget development, and project funding. Standards are used by the institutions, system office, and executive budget office. They are generally accepted by those who use them. However, standards were developed by the Department of

Public Works and are essentially modifications of general construction guidelines using the Western Interstate Commission on Higher Education (WICHE) factors and apply only to classrooms and office and most support space.

Individual institutions submit capital budget requests to their respective central offices, which in turn, review and prioritize the requests and then submit a system-wide request to the Department of Higher Education. The Department reviews the unit requests and makes a recommendation to the Connecticut Board of Governors for Higher Education. The Board, in turn, approves a consolidated public higher education capital budget request which is then submitted to the Office of Policy and Management and to the Governor. Ultimately, the Connecticut General Assembly approves a bond bill which supports some of the individual projects and dollar amounts requested by the institutions.

Bond funds are either general obligation or self-liquidating, the latter being repaid through dedicated fees.

Delaware

Delaware does not utilize space standards or guidelines in planning and budgeting for higher education facilities. Each institution deals directly with the Delaware Legislature to secure funds for capital outlay projects.

Florida

Both the Florida Community College System and the State University System of Florida use facility standards/guidelines in the budgeting process. The primary use of standards/guidelines is for the preparation of education system budget requests. They are also used in campus planning and management and all phases of the budget process. The existing space standards are generally accepted by all participants in the higher education facilities budgeting process including the Governor's budgeting office and the appropriations committees in both legislative houses.

Space standards exist for classrooms, teaching labs and research labs (except for Community Colleges which do not have a research mission), and offices. Standards vary by discipline or program specialty for teaching labs and classrooms. Discipline, the number of FTE research faculty, and graduate FTE affect the research lab standards. Office space standards are based on total FTE positions that require office space.

Primary funding for capital outlay is through bonds. Dedicated utility tax receipts are used to make the bond payments. The funding process itself is two-pronged based on the type of revenue. Capital improvement money is generally used for student-related projects in the university system. It is generated on a student credit hour basis. Academic building requests are reviewed and prioritized by the two system offices prior to inclusion in a combined Department of Education capital outlay budget.

Georgia

Georgia does not utilize space standards or guidelines. Funding requests on a project-by-project basis are submitted by each campus. The Board of Regents prioritizes the system-wide list and submits it to the Governor and Legislature. New construction funds are appropriated in specific amounts for specific projects. General obligation bonds are the major source of funding. State general revenue is used for debt service.

Hawaii

Space standards have been used for more than 10 years in Hawaii. They are used primarily for campus facilities planning and management. The standards are used as guidelines only and are based on NCHEM factors. The need for space is perceived as critical, though enrollment is not expected to increase in the next five years. While space standards are generally accepted in institutions of higher learning and state governing bodies, their use is not mandatory.

Bonds and state general revenue funds are the normal sources for facilities which appear as specific projects in budget line items.

Idaho

Idaho does not utilize space standards or guidelines. Specific project requests appear as budget line items after approval is given by the State Board of Education, the State Division of Public Works (Department of Administration), and the Permanent Building Fund Advisory Council.

Normal fund sources are the state's general revenue and dedicated tax funds (Permanent Building Fund: $10/head; $500,000 of sales tax; and a percentage of beer and cigarette taxes).

Illinois

The Board of Higher Education indicated there are no statutory or regulatory guidelines which set or establish space requirements for determining eligibility of capital projects. Guidelines may be used by the various governing boards but they do not play a role in state level review. Inventory and utilization data are maintained and use studies are conducted.

The requests of the governing boards are submitted to the Board of Higher Education which reviews the requests and submits its recommendations to the Governor. The requests are then reviewed by the Bureau of the Budget and the Capital Development Board. The Governor's budget is submitted to the Legislature. Appropriations are made to the Capital Development Board in two forms: a lump sum "Build Illinois" amount for repair and renovation, and specific amounts for specific major capital projects. Funding is from a combination of bonds and some general revenue funds. Bonds are amortized from state general revenues and, in the case of Build Illinois Bonds, from dedicated tax revenues. Community Colleges are required to provide 25 percent of funding from local sources which could include local tax revenues.

Indiana

Indiana does not have state-wide standards-/guidelines. The Indiana budget process involves three phases: (1) requests for planning funds from a $2 million revolving fund; (2) requests for funding of schematics; and (3) final construction funding. The Higher Education Commission is involved in all three phases. Appropriations are made directly to institutions with tuition-backed revenue bonds used for major projects and state general revenue appropriations (on a formula basis) for general repairs and rehabilitation. The Legislature makes specific "tuition replacement" appropriations from general revenues to offset the tuition used to pay the bonds.

Iowa

The Iowa Board of Regents does not use space standards or guidelines in the capital budgeting process. Each year, the institutions prepare requests for specific projects which are reviewed by the Regents staff. The Regents adopt both a capital construction request and a ten-year plan each year. The review process is essentially one of negotiation with the institution in a rather short (two month) review time frame.

Iowa has an active capital program and relies almost entirely on bonding. Bonds are backed by tuition revenue which is replaced by a specific appropriation for "Tuition Replacement." While this is not a legal commitment, the Legislature has never failed to make the necessary appropriation.

Kansas

The University of Kansas system uses space standards for higher education facilities in their budgeting process. The standards are used by all of those involved in the budget development and review. Standards are used for planning, building design, budget development, executive and legislative review, and funds allocation. The standards were developed by a joint effort and are accepted by all who use them. Standards were developed in 1972 and have been updated and simplified. Standards exist for classrooms, teaching/research labs and office space. Standards applied for research labs are broad guidelines due to the wide variety of needs, e.g., agriculture/greenhouses.

Since 1946, $1 million of the state property tax has been dedicated annually to the Educational Building Fund (EBF). Institutions submit requests to the Board of Regents which develops budget requests to submit to the Governor. Due to Kansas' form of government, the Legislature usually adopts the Governor's recommendation. The tax monies go to the Board of Regents but are appropriated by the Legislature through the budget process. Construction is funded through state general revenue and the EBF. Revenue bonds are used for self-supporting facilities.

Kentucky

Kentucky does not use standards/guidelines in their capital budgeting process. Projects which cost more than $200,000 are reviewed by the Council of Higher Education (CHE). The CHE staff, with the assistance of an independent architect, reviews the funding requests from the institutions and prepares a priority list by category (e.g., safety, improvements, project investments, etc.). The priority list is then reviewed by CHE and submitted to the Governor/Legislature.

Appropriated funds are provided in specific amounts for specific projects to individual institutions. Normally, funding for higher education facilities is provided from revenue bonds and state general revenue. Bonds provide the major source. Debt service is paid from general revenue funds.

Louisiana

Louisiana does not use standards/guidelines in the capital budgeting process. Each institution prepares justification for budget requests on a project basis; the requests are reviewed by the Management Board, then by the Board of Regents, which ranks them in priority order. Capital outlay requests follow the same budgeting process as all other state agencies. Funds are appropriated to a state construction agency.

Bonds and state general revenue are the normal source of funds for higher education facilities. General obligation and revenue bonds provide the major source of funds. Debt service is from general revenue with a small portion paid by race track fees.

Maine

Maine makes limited use of space standards for faculty and administrative offices and general purpose classrooms. These are used by the University of Maine for building project design.

The University of Maine System contains seven campuses and the public broadcasting network. Every two years campuses submit their capital construction requirements for the following five years. In their biennial budget process, the System Office holds extensive hearings and reviews the campus requests to establish priorities for the capital request. The System Office recommendations are submitted to the University System Board of Trustees for further review. The program approved by the Trustees is submitted to the Governor for inclusion in the Governor's budget. The System may go directly to the Legislature with its requests as well. General obligation bonds are the primary source of funding. Debt service on these bonds is paid directly by the State. The University System is authorized to borrow money at tax exempt rates for self-supporting projects. Debt service on System borrowing is paid by the System.

Maryland

The Maryland State Board of Higher Education uses space standards/ guidelines for the budgeting process. The standards cover two basic areas: education-unique standards and statewide standards for common types of space. Standards/guidelines are used in campus planning, preparation of budget requests and in considering appropriations. The community colleges have separate standards. The standards for classrooms are based on enrollments and do not vary by discipline. Standards also exist for research and teaching labs and office space.

Funding for capital budgeting is provided primarily through general obligation bonds and state property tax revenue bonds; these funds are supplemented by the general revenue if a surplus exists. New construction funds are appropriated by phase of project for specific projects to a state building agency.

Massachusetts

In Massachusetts, two sets of guidelines developed in the 1960s are used infrequently for reference only.

Requests for capital outlay funds for higher education go through the Board of Regents to the Division of Capital Planning and Operations which develops the Governor's budget recommendations to the legislature.

Bonds are the major source of funds. Payments are made through general revenue and tuition and fee revenues.

Michigan

Michigan does not use space standards or guidelines in their budgeting process. Funding requests are presented directly to the Department of Management and Budget by the institutions. The Department of Education is not involved in the funding process. Most funding is generated through revenue bonds. Specific facilities funding is determined by individual institutions and their governing board.

Minnesota

Minnesota has four higher education systems, including the University of Minnesota System, State University System, Community College System and Technical Institutions. Some systems use space standards they have developed independently for planning and budgeting. The Higher Education Coordinating Board is not involved in the capital facilities budget process. Funding requests on a project basis, generated at the institutional level, are prioritized at the system level and sent to the Legislature. The Legislature reviews and then re-ranks the requests in priority order in the context of all other capital funding requests statewide and makes appropriations. The Legislature does not make extensive use of standards. Funding for facilities is provided through bonds.

Mississippi

Mississippi does not utilize space standards or guidelines in its facilities budgeting process. However, the state requires, as a part of institutions' justification for new construction, that objectively based analyses be included in the request. Institutions request funds through the State Board, which submits requests to the Legislature. The Legislature appropriates funds to the Bureau of Buildings, Ground and Real Property Management. Appropriations are for specific amounts by project for new construction and are given in lump sum for rehabilitation and repair. Funding is provided through general revenue, although the 1988 Session of the Legislature authorized a general obligation bond issue for improvements.

Missouri

Missouri does not use space standards or guidelines in its capital budget process. The institutions prepare project requests following annual guidelines issued by the Coordinating Board of Higher Education (CBHE) in the Spring. Requests are reviewed and categorized into priorities by the CBHE staff. The review is in detail and the staff relies on the institutions to justify their needs. The Board holds hearings in September and adopts its recommendations in October. Institutions may also go directly to the Governor; however, the CBHE recommendations are the "talking" document.

Missouri has had a strong capital program that is funded from a combination of state general revenue and general obligation bonds backed by general revenues. Appropriations are made to each institution for specific projects. Community colleges are not eligible for general revenue capital appropriations.

Montana

Montana institutions use space guidelines for the planning process only. Guidelines were developed by the institutions and the governing board and exist for classrooms, teaching labs, and office space.

Montana institutions develop long-range plans for construction that are approved by the Board of Regents (BOR). The BOR visits campuses to discuss space needs and to develop priorities for recommendation to the Governor. Higher education construction needs are merged with the construction needs of all other state agencies in the Governor's budget. The BOR may lobby their interests whether or not they are in the governor's budget. Most funding is obtained from a dedicated cigarette tax for all state construction.

Nebraska

The three campuses of the University of Nebraska use guidelines formalized in 1985 for their educational facilities. Previously, each campus had its own guidelines. The four state colleges do not use standards or guidelines. The colleges develop funding needs in consultation with an architect. Community colleges are under local control.

The University of Nebraska uses the guidelines to estimate space needs and to develop program statements. Guidelines are used primarily by the institutions and the University Central Administration. The executive budget office and legislative staff are interested only if the request is out-of-line with others. Guidelines are used for planning, project design, and preparation of budget requests. They were developed by a joint effort between the institutions, University Central Administration and an outside consultant. Guidelines exist for classrooms, teaching labs, research labs, and office space. Space needs are based on student related factors including average station size, station occupancy goals, utilization goals, and weekly contact hours.

The budget process in Nebraska requires that projects over $100,000 be included in a six-year capital facilities plan. Needs statements are submitted as part of the biennial program budget process. The Building and Budget Divisions of the Department of Administration review requests and submit priorities in the Governor's budget. Normal sources of funding for the State of Nebraska are the Building Fund and the Capital Construction Fund (Cigarette Tax). The other source of funding is private donations and federal funds. The constitution prohibits the state from going into debt for more than $200,000 so the state may use private bonding authorities, political sub-divisions or other mechanisms to provide revenue bonds for capital construction.

Nevada

Nevada does not use space standards or guidelines in the capital budgeting process. The Public Works Board supplies a standard cost per square foot of building space, but no education-specific standards are used in the budget request process. Project requests are submitted to the Public Works Board, which prioritizes all requests and may approve the request. Facilities projects are funded by general obligation bonds and state general revenue.

New Hampshire

New Hampshire has recently developed space guidelines/standards. Standards and guidelines for ten broad categories of Education and General space are currently under review by the USNH Board of Trustees and are being used by both the Chancellor's Office and the Board to evaluate long-term capital needs.

New Jersey

The New Jersey Department of Higher Education uses space standards/guidelines in capital budgeting. The standards were developed in 1971 and have not been updated since. An intensive review is planned for 1989.

The guidelines apply to all two- and four-year institutions, and encompass classroom, teaching labs, and offices. The guidelines are aggregate in nature, although the laboratory standards vary by discipline. They are used in the annual allocation of renewal and replacement funds ($12 million annually for 11 senior campuses). No direct general revenue appropriations for new projects have been made in several years. Bond funds have been available for High-Tech facilities and Rutgers has independent authority to issue revenue bonds. In addition, some student fee income is used for bonding.

The Department of Higher Education feels that facility needs in New Jersey are severe. A major bond issue was passed in 1988 which will provide funds (to be matched in varying proportions) for construction at both public and independent colleges.

New Mexico

New Mexico does not use space standards for higher education facilities planning and budgeting. The Higher Education Commission reviews institutional requests on a case-by-case basis.

New Mexico institutions develop five-year master plans for their capital outlay requests to the Commission. The Commission's Facilities Committee reviews requests and recommends a budget for submission to the Governor. The Commission also submits a separate budget request to the Legislature. Also, institutions may find their own sponsors to introduce specific project bills.

Most construction is funded through general obligation bonds that are repaid through dedicated property taxes. A dedicated severance tax is also used, although it has been at its maximum in recent years.

New York

New York uses space standards/guidelines for some capital facilities funding requests. The standards for both SUNY and CUNY are accepted by all parties involved in the budget process and are used in most aspects of the preparation of budget requests. Standards exist for classroom, teaching labs, and office space. For classrooms and teaching labs, standards are based on student-related factors. Office space standards are based on number of faculty and nonfaculty positions.

Funding comes through bonds, state general revenue, and local tax revenue. Bonds are the major source of funding for higher education facilities. Each system (CUNY and SUNY) makes a budget request to the Governor annually. The request becomes part of the Executive budget and then proceeds to the Legislature. Appropriations are made in specific amounts for specific projects.

North Carolina

North Carolina does not use standards or guidelines in its capital budgeting process. Budget requests are generated at the campus level, then reviewed by the Board of Governors, which, in turn, makes recommendations to the Advisory Budget Commission. Facilities inventory and utilization data are among the factors considered by the Board of Governors in reviewing and prioritizing capital project requests. Prior to approval by the Board of Governors a capital construction project must be prepared in a specified format with detailed unit costs and square footage requirements to be included. This completed cost estimate is validated for accuracy by the chief estimator in the State Construction Office.

Bonds and state general revenue represent the normal sources of funds for Education and General Program facilities. State general revenue is the major source.

North Dakota

Architectural estimates, not space standards or guidelines, are used to determine the amount of funds budgeted for facilities. State general fund appropriations are the major fund source for higher education facilities, though no new facility from this source has been built since 1982. Facilities such as dormitories and student unions are constructed through the use of revenue bonds. The bond payments are made from board and room rentals or student fees.

Capital outlay funds are obtained through requests to the Board of Higher Education which prioritizes the requests and submits them to the Governor for submission to the Legislature.

Ohio

While detailed space standards exist in Ohio, they are used only to a limited extent by the Board of Regents. Standards are not utilized at all in the executive and legislative budget review process.

Ohio's guidelines were developed in 1974, have not been updated since, and operate at a somewhat aggregate level, although discipline variations are reflected in the laboratory space guidelines. Inventory and utilization data are reported biannually.

Ohio has a large capital program. Requests are based on priority guidelines developed in cooperation with the state budget office and are part of a six-year plan. After Regents' review and hearings, the consolidated request is reviewed by the state budget office and the Legislature appropriates specific amounts for projects to the Regents.

"Revenue" bonds pledging student fees (but actually paid by general revenues) are the major source of funding.

Oklahoma

Oklahoma uses space standards in the capital budgeting process. Utilization and condition of existing space is evaluated before approving new space. Standards are used by the system office to prepare budget requests. After appropriation, the State Regents use standards to allocate money to specific institutions and building projects. Standards exist for classrooms, teaching labs, and office space. All three types of standards are linked to student-related factors.

In the capital budgeting process, projects are ranked in categories of priorities: repair/renewal, equipment, non-structural improvement, and new construction.

Oregon

The Oregon State System of Higher Education uses space standards/guidelines in capital budgeting. They are used primarily at the system level, although they influence the size and scope of the requests of the eight four-year colleges and universities. While not formally accepted, the state executive and legislative review agencies have not discouraged their use.

The guidelines were developed in the early 1970s by the State system and the institutions and are derived from standards used in California, Texas, and Florida. They were reviewed and updated in 1980. Room size/type is a variable in the classroom standards. In the case of teaching labs, criteria vary between lower and upper division courses. The research lab guidelines are really design criteria and vary by discipline. Research positions/programs and graduate enrollments are the primary criteria. Office space relates to positions, including teaching assistants (but not all graduate assistants).

The capital program is active and involves consolidation at the state system and the State Department of Education (for local community colleges). State projects are funded through a combination of general obligation bonds and general revenue. Local community colleges provide 65% of cost from local sources (primarily property taxes). Bonds are retired by general revenues. Appropriations are on a project-by-project basis and final release of funds is subject to authorization by the State Emergency Board (a continuing legislative fiscal committee).

The state level organization of community colleges changed in 1987, and new approaches to budgeting in that system are being developed.

Pennsylvania

The State of Pennsylvania does not use space standards or guidelines in budgeting for capital facilities. The State System of Higher Education (SSHE) is now in the process of developing a more accurate data base leading to the future development of standards. Pennsylvania State University (not part of the State System) does not have or use space standards in its budgeting process. Inventory and utilization data are maintained in both major higher education systems, although additional work is being done in the SSHE to improve the reliability of the data.

The capital budget process in Pennsylvania is quite complex and elongated. Requests of the state-owned and "state-related" universities are consolidated by the Department of Education, prioritized, and then sent to the Governor. The State Budget Office recommends a list of projects to the Governor (who adds or deletes) and then submits a set of recommendations to the Legislature. The Legislature sometimes adds additional projects, the majority of which are item vetoed Funds are appropriated to the Department of General Services and release is keyed to project-by-project approval and the sale of general obligation bonds backed by general revenue.

Rhode Island

Rhode Island does not use space standards/guidelines in the budgeting process. Facilities funding in Rhode Island is supported almost exclusively through general obligation bonds. Every two years, a Capital Development Plan is developed and submitted to the Legislature. All facilities funding requests, after approval by the Legislature, must be approved by the voters Each year the state appropriates funds to cover amortization.

South Carolina

South Carolina does not use space standards or guidelines in its capital budgeting process. Funding determinations are based on facility utilization, enrollment trends, program changes, and other factors.

In the South Carolina budget process, the Commission on Higher Education visits each institution biannually to assist in the development of the capital outlay priority list to be submitted to the Budget and Control Board. General obligation bonds provide the major source of funding for higher education facilities. Additional funding is provided through revenue bonds for the hospital.

South Dakota

The public institutions of higher education in South Dakota utilize locally derived space standards/guidelines in both the management of existing facilities and the planning for new facilities. However, no standards/guidelines are utilized at the state level by the Board of Regents, executive branch or legislature in developing budgets and appropriating funds.

The institutions must be authorized by the Board of Regents to initiate preliminary plans and costs for projects. After specific projects are approved by the Board of Regents they are placed on a priority list. The Board decides which priority projects are included in the annual budget request. The Board may request funding from the Legislature or the authorization of the construction only. The Legislature may authorize a study for planning and design of the project. The process is lengthy and may take a number of years for full funding to be granted.

The South Dakota Building Authority handles the bonding and financing of such projects and receives its funds primarily from bonds.

Tennessee

The Tennessee Higher Education Commission (THEC) uses standards/ guidelines in the budgeting process. The guidelines/standards are used in all aspects of funding acquisition and allocation and by all parties involved in the process. The same standards/guidelines are used by community colleges and universities. The standards are based on national standards, custom-fitted to Tennessee's needs by institution and state staff. The standards were modified within the last five years and are used for classrooms, teaching labs, and faculty office space. Standards are based on student related factors.

Funding is provided primarily through general obligation bonds. Funding requests are generated at the institutional level, forwarded to the governing boards for prioritization and submitted to THEC, which consolidates requests and sets priorities. The requests then follow the normal budgeting process through the Governor's Office to the Legislature.

Texas

Texas has only a limited set of space standards or guidelines which are used only in a highly aggregated form in the budgeting process. The highly aggregated guidelines are not based upon specific needs for specific types of space. Hence, specific space standards for classrooms, teaching labs, etc. do not exist, except in a theoretical sense.

Individual institutions receive earmarked allocations from the Texas Campus Planning Coordinating Board for specific projects. The institutions must then develop plans and submit them to the Coordinating Board. No construction is possible without approval from the Coordinating Board. The Legislature or other executive agencies are not involved in the building process.

Funding is provided primarily through general revenue and the Permanent University Fund, which is funded through oil and gas leases. Additional funding is provided by bonds and dedicated tax funds.

Utah

The Board of Regents (which encompasses all public higher education in Utah) uses space standards/guidelines in their capital budget process. The standards are applied to both two- and four-year institutions and are a combination of standards specified by the State Building Board, and those subsequently developed by the Regents office. The Building Board's standards are accepted but are felt to be restrictive. These standards apply to classrooms and teaching labs. The Regents standards (for research and office space) are considered to be more realistic by the institutions.

The Building Board's standards have been in effect for more than ten years and are essentially the California Restudy Standards minus 10 percent. The Regents' standards are derivations of the NCHEMS Space Analysis Manuals. Inventory and utilization records are maintained, and utilization studies are conducted annually.

Utah has had a continuing, though rather small, capital program in recent years with the main revenue sources being state general revenues and short-term (five-year) general obligation bonds. The budget process involves the determination of higher education priorities by the Regents using both objective and subjective considerations. The State Building Board develops an overall state priority list for consideration by the Governor and submission to the Legislature. The Board also coordinates the construction program once appropriations are made to the institutions.

Statewide renovation funds for such things as parking, roof repair and code compliance are appropriated to the State Division of Facilities and Construction Management.

Vermont

Vermont does not use standards or guidelines in its budgeting process. Vermont is on a biennial budget cycle. All requests are sent to the Governor, including an indication of what portion of the funding the institution will provide and what portion is requested from the state. Funds are appropriated in specific amounts for particular projects. Funding for projects is equally divided between tuition and fee revenue bonds, state general revenue, and private donations.

Virginia

Virginia uses space standards/guidelines in its budgeting process. The same standards are used for community colleges and universities, and in all aspects of the planning and budgeting process, except for building project design. All parties involved in the funding process use and accept the existing space standards. Standards/guidelines are in place for classrooms, teaching labs, research labs, and office space. The classroom and teaching lab standards vary based on size and type of institution. Standards/guidelines for office space are based on the number of faculty positions.

Funding for higher education facilities comes through bonding and state general revenue. The funding requests are generated at the institutional level and forwarded to the State Engineering and Building Agency and the State Council on Higher Education. The State Council on Higher Education reviews requests against the guidelines and makes recommendations to the Governor's Office of Planning and Budgeting. The Governor includes his recommendations in the Executive Budget to the General Assembly.

Washington

In Washington, the community college system actively uses space standards/guidelines in its capital budgeting process. The six public four-year universities may use criteria developed in the mid-1970s as planning guides or may use such other standards as they feel are appropriate. State level staff indicated that standards do not play a role in their review, although they are aware of their use by the community college system and generally feel comfortable with the criteria.

The community college standards have been in effect since the mid-1970s and were last updated in 1977. They differentiate classroom space by institutional size, teaching labs by discipline and derive office space by FTE faculty "entitlement" (which is driven by FTE students by discipline category). Inventory and utilization data are maintained, although the extent of utilization data in the four-year schools is uncertain.

The capital budget process is straightforward with each governing body developing requests and six-year plans, and forwarding them to the Office of Financial Management. Copies are provided, primarily for information, to the Higher Education Coordinating Board. Following the Governor's recommendation, the Legislature considers, modifies, and funds the capital program through a combination of: (1) general obligation bonds backed by dedicated tuition revenues and general revenues; (2) modest general revenue appropriations; and (3) other sources in- cluding state land revenues, dedicated tuition funds, etc. The Office of Financial Management controls the release of funds.

West Virginia

West Virginia does not use standards/guidelines. A detailed, on-site review is conducted by the Board of Regents to evaluate new construction requests and assess the condition of existing buildings.

Full authority has been given to the governing board to collect and spend money, including selling bonds, but the Legislature must authorize all projects. The majority of the funds used for capital outlay are generated through bonding, with student fees providing the revenue for debt service.

Wisconsin

The University of Wisconsin System uses space standards/guidelines in its capital budget process for all campuses, including the two year centers. The guidelines appear to be traditional in nature, operate at an aggregate level and are accepted by all participants in the capital budgeting process. The planning and budgeting process compensates for the level of generality through the use of special studies of space needs (including peer reviews) in the project development phase. Inventory and utilization records are kept. In addition, on-site unannounced audits of space use and utilization are conducted.

Wisconsin has an active capital program and relies primarily on general obligation bonds backed by general revenue for financing. The capital budget process is managed by a State Building Commission, comprised of the Governor, one minority and two majority members from each house, and one private citizen. The Commission reviews all capital requests and makes recommendations to the Legislature. It also controls the release of funds and oversees project adjustments after the appropriations are made.

Wyoming

Wyoming does not use official state standards/ guidelines in their budgeting process. Each institution has the freedom to pursue general obligation bonds. The colleges also take their appeals for funding directly to the Legislature, where they compete with all other state departments for funds. Funding is provided through general obligation and revenue bonds, state general revenue, dedicated mineral tax funds and private grants, with bonding providing the major source of revenue.

Ontario (Canada)

The Ontario universities use space standards-/guidelines in their capital planning and budgeting. The criteria used by the universities are macro standards developed by the Council of Ontario Universities and used by the Ministry. These standards have been in effect over 10 years but have been recently updated. Inventory and space use records are kept and space utilization studies are conducted.

Within the macro standards, the University of Toronto has developed planning guidelines to meet their needs. The classroom guidelines relate to enrollments and section size, while the teaching lab criteria vary by discipline, course level, and fixed equipment needs. Research space guidelines are more fluid, relating to discipline specialties and the type of lab. Office space standards exist for seven categories of positions.

2.2 Overview of Facilities Budgeting Processes in Other Selected Universities

In addition to the telephone surveys of the 50 states and one Canadian province, we also surveyed a selected set of other universities to determine their levels of use of space standards/guidelines. The following paragraphs provide a brief overview of our findings for each of the selected universities.

Brigham Young University

Space standards/guidelines are used in capital budgeting at Brigham Young. BYU also does the facilities planning for the other Latter Day Saints institutions (Rick's College in Idaho and BYU-Hawaii) for overall church-funded development. The guidelines are used in facilities planning, project design, and in preparation of budget estimates. Space inventory and utilization records are maintained, and use studies are periodically conducted.

Bucknell University

Bucknell does not use space standards/guidelines in capital development. New buildings are planned based on the expressed and justified needs of the departments. Cost estimates are prepared in conjunction with the department and administrative staff. In the case of complex projects, an architect is brought in early to assist with planning. Although space inventory data are maintained, no space utilization information is kept.

Harvard University

Harvard does not have a formal system of space standards or guidelines for use in capital planning. Construction of new or remodeled space is the responsibility of each faculty (school) and the Office of Planning assists in project development through provision of information on space planning guidelines to the deans and their staff. Space inventory records are maintained and utilization records for scheduled space are kept, in varying degrees, by the faculties.

Loyola University of Chicago

Loyola does not use space standards/guidelines in capital development. New buildings are planned, and cost estimates are prepared in conjunction with the department, plant director, and an architect. The university retains an architect to oversee the process and supervise the work of the contract architect. Space inventory and utilization records are maintained and reported each two years to the State of Illinois.

Massachusetts Institute of Technology (MIT)

Space standards/guidelines are used to a great extent in capital planning at MIT. The guidelines are viewed as evolving and are constantly being updated. One of the precepts at MIT is that space is a central resource so the Office of Planning is involved in all aspects of facilities development and remodeling. Inventory and utilization records are maintained and annual usage studies are conducted.

MIT has just finished a major study of their classroom guidelines. The guidelines vary by room type and function and by the type of interior furnishings required by the discipline. Teaching lab guidelines are sensitive to unique departmental criteria and vary by discipline, course level, and room type. They have done extensive work in research lab criteria. The nature of the work to be done drives the scale of the stations which are then related to the number of people who will be in the lab. The prime variable in the guidelines is the discipline. They use a general index of space criteria and adapt it to the specific discipline. Office space guidelines exist and faculty level is taken into account in the guidelines.

Reed College

Reed College does not use space standards or guidelines in capital planning or budgeting. Needs are reviewed on-campus and both preliminary and final work is done through an architect. General space criteria can be determined from existing examples on the campus. No inventory or utilization records are kept.

Yale University

Yale University uses space criteria in its capital planning although they are not specific guidelines. For example, there are no numeric guidelines for classroom space since sizing is determined in the context of the size of existing facilities of a similar nature. Guidelines do exist for research and teaching labs and offices, however, and are used in facilities planning, building project design, and preparation of budget estimates. The guidelines were developed by the Office of Facilities Planning over ten years ago and are updated continuously. Inventory and space utilization records are maintained and periodic studies are conducted.

The guidelines for teaching labs are not related so much to enrollment as to program. They also vary by course level of instruction. Research lab space guidelines are program specific and are designed to provide space for the research team and do reflect differences in faculty rank. A similar distinction is made in the office space guidelines.

2.3 Summary of Findings About the Use of Standards/Guidelines in Other States

Exhibit 2.1 provides a tabular summary of the status of the use of higher education facilities standards/guidelines in the 50 states and Ontario.

Based upon the information presented in both the preceding sections of this chapter and the summary presented in Exhibit 2.1, the following findings can be made about the status of the facilities budgeting processes in the states.

- Twenty-five states do not have formal space standards or guidelines used in the planning and budgeting for higher education facilities. These states generally appropriate funds for facilities on a project-by-project basis.
- Minnesota, Maine, Connecticut, South Dakota and Hawaii make limited use of formal standards/guidelines, e.g., standards/guidelines exist only for some space categories or the standards/guidelines are not used at the state level for budgeting purposes.
- Twenty states and Ontario use space standards and guidelines in the planning and budgeting process.

- Texas is the only state where the legislature does not appropriate funds on a project-by-project basis. Project decisions in Texas are made by the various governing boards and the Texas Higher Education Coordinating Board.
- Only five states reported that their legislatures utilized space standards/guidelines in making decisions about appropriations for higher education facilities.
- Although several states have updated components of their standards in the past five years, basic formula structures have remained unchanged. Since most states have patterned their space formulas and standards after the original work done in California, no dramatically new or innovative approaches to space planning or methods were published in the 1960s.

Of the 25 states reporting the existence and/or use of higher education space standards, we selected 18 states and Ontario for detailed site visits and study. The remaining seven were not selected for site visits for a variety of reasons.

Maine, Connecticut, South Dakota, and Hawaii were not selected due to their limited use of standards. Minnesota was not selected because each of the systems utilized a different set of standards and the standards are not recognized by the HigherEducation Board or the Legislature. Alaska and Montana were not selected because of the relatively small size of many of their higher education institutions.

The 18 selected states and one Canadian province from which detailed data was collected were:

California
Colorado
Florida
Kansas
Maryland
Nebraska
New Hampshire
New Jersey
New York
Ohio
Oklahoma
Oregon
Tennessee
Texas
Utah
Virginia
Washington
Wisconsin

Ontario

Upon conducting site visits in the state of Texas, it was found that the state does not use a consistent set of standards for evaluating space needs. Therefore, Texas was not included in the detailed comparisons in the following sections of this report. In New York, the City University standards were considered to be design criteria and the State University standards were department specific and could not be compared. New York was therefore also excluded from the detailed comparisons.

EXHIBIT 2.1 Summary of Status of Space Standards/Guidelines in the 50 States and Ontario, 1988

CHARACTERISTICS OF FACILITIES BUDGETING PROCESS	STATES													
	AL	AK	AZ	AR	CA	CO	CT	DE	FL	GA	HI	ID	IL	IN
1. Higher Education funds appropriated within last 5 years	x	x	x	x	x	x	x	x	x	x	x	x	x	x
2. Space standards and guidelines exist		x			x	x	x		x		x			
3. Standards and guidelines used in budgeting process		x			x	x	x		x		x			
4. Standards and guidelines used by: • Universities		x			x	x	x		x		x			
• State Higher Education System (s)		x			x	x	x		x		x			
• State Executive Budget Office					x		x		x					
• Legislature					x				x					
• Other														
5. Standards and guidelines used for: • Campus planning & management		x			x	x	x		x		x			
• Building project design		x				x	x		x		x			
• Preparing institution budget request		x			x	x	x		x		x			
• Preparing systemwide budget request		x			x	x	x		x		x			
• Preparing governor's budget request					x	x	x		x					
• Legislative appropriation					x	x	x		x					
• Allocating funds to institutions							x							
• Allocating funds to projects														
6. Standards or guidelines developed by: • Institutions					x	x								
• State system body		x			x	x								
• State building authority							x							
• Governor's office														
• Legislature									x					
• Outside Consultant						x								
• Joint Committee									x					
• Other											x			
7. Standards or guidelines have been used for more than 5 years		x			x	x			x		x			
8. Standards or guidelines last updated: • within last 5 years		x				x	x		x					
• 5-10 years					x									
• more than 10 years														
9. Standard or guidlines exist for: • Classrooms		x			x	x	x		x		x			
• Teaching laboratories		x			x	x			x					
• Research laboratories		x			x	x			x					
• Office space		x			x	x	x		x					
10. Institutions maintain space inventories by type of space	x	x	x	x	x	x	x		x	x	x	x	x	x
11. Institutions keep utilization records	x	x	x		x	x			x	x	x	x	x	x
12. Utilization studies are conducted	x	x	x		x	x			x	x		x	x	x

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EXHIBIT 2.1 (continued)

CHARACTERISTICS OF FACILITIES BUDGETING PROCESS	STATES													
	IA	KS	KY	LA	ME	MD	MA	MI	MN	MS	MO	MT	NE	NV
1. Higher Education funds appropriated within last 5 years	x	x	x	x	x	x	x	x	x	x	x	x	x	x
2. Space standards and guidelines exist		x			x	x			x			x	x	
3. Standards and guidelines used in budgeting process		x				x			x			x	x	
4. Standards and guidelines used by:														
• Universities		x	x		x	x			x			x	x	
• State Higher Education System (s)		x				x			x					
• State Executive Budget Office		x				x								
• Legislature		x												
• Other														
5. Standards and guidelines used for:														
• Campus planning & management		x				x			x			x	x	
• Building project design		x			x								x	
• Preparing institution budget request		x				x			x				x	
• Preparing systemwide budget request		x				x			x				x	
• Preparing governor's budget request		x				x			x					
• Legislative appropriation		x				x								
• Allocating funds to institutions		x												
• Allocating funds to projects		x												
6. Standards or guidelines developed by:														
• Institutions		x										x	x	
• State system body		x			x	x						x	x	
• State building authority						x								
• Governor's office		x												
• Legislature		x												
• Outside Consultant		x				x								
• Joint Committee														
• Other									x					
7. Standards or guidelines have been used for more than 5 years		x				x			x			x	x	
8. Standards or guidelines last updated:														
• within last 5 years													x	
• 5-10 years		x				x			x					
• more than 10 years												x		
9. Standard or guidlines exist for:														
• Classrooms		x			x	x			x			x	x	
• Teaching laboratories		x				x			x			x	x	
• Research laboratories		x				x			x				x	
• Office space		x			x	x			x			x	x	
10. Institutions maintain space inventories by type of space	x	x	x	x	x	x	x		x	x	x	x	x	x
11. Institutions keep utilization records	x	x	x	x			x		x	x			x	x
12. Utilization studies are conducted	x	x	x	x	x		x		x	x		x	x	

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EXHIBIT 2.1 (continued)

CHARACTERISTICS OF FACILITIES BUDGETING PROCESS	STATES													
	NH	NJ	NM	NY	NC	ND	OH	OK	OR	PA	RI	SC	SD	TN
1. Higher Education funds appropriated within last 5 years	x	x	x	x	x		x	x	x	x	x	x	x	x
2. Space standards and guidelines exist	x	x		x			x	x	x				x	x
3. Standards and guidelines used in budgeting process	x	x		x			x	x	x					x
4. Standards and guidelines used by:														
• Universities	x	x		x			x		x				x	x
• State Higher Education System (s)	x	x		x				x	x					x
• State Executive Budget Office	x			x										x
• Legislature														x
• Other														
5. Standards and guidelines used for:														
• Campus planning & management	x	x		x			x		x				x	x
• Building project design	x	x		x					x				x	x
• Preparing institution budget request	x	x		x			x		x				x	x
• Preparing systemwide budget request	x	x		x				x	x					x
• Preparing governor's budget request	x			x										x
• Legislative appropriation														x
• Allocating funds to institutions		x						x						x
• Allocating funds to projects		x						x						x
6. Standards or guidelines developed by:														
• Institutions							x		x					
• State system body	x						x	x	x					
• State building authority														
• Governor's office														
• Legislature														
• Outside Consultant	x						x							
• Joint Committee				x										x
• Other													x	x
7. Standards or guidelines have been used for more than 5 years		x		x			x	x	x					x
8. Standards or guidelines last updated:														
• within last 5 years	x													x
• 5-10 years								x					x	
• more than 10 years				x										
9. Standard or guidlines exist for:														
• Classrooms	x	x		x			x	x	x				x	x
• Teaching laboratories	x	x		x			x	x	x				x	x
• Research laboratories	x						x		x				x	
• Office space	x	x		x			x	x	x				x	x
10. Institutions maintain space inventories by type of space	x		x	x	x	x	x	x	x	x	x	x	x	x
11. Institutions keep utilization records	x				x	x	x	x	x	x	x	x	x	x
12. Utilization studies are conducted					x		x	x	x	x		x	x	x

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EXHIBIT 2.1 (continued)

CHARACTERISTICS OF FACILITIES BUDGETING PROCESS	STATES								
	TX	UT	VT	VA	WA*	WV	WI	WY	Ontario
1. Higher Education funds appropriated within last 5 years	x	x	x	x	x	x	x	x	x
2. Space standards and guidelines exist	x	x		x	x		x		x
3. Standards and guidelines used in budgeting process		x		x	x		x		x
4. Standards and guidelines used by:									
• Universities	x	x		x	x		x		x
• State Higher Education System (s)	x	x		x	x		x		x
• State Executive Budget Office		x		x			x		x
• Legislature				x					x
• Other									
5. Standards and guidelines used for:									
• Campus planning & management	x			x	x		x		x
• Building project design		x			x		x		x
• Preparing institution budget request	x	x		x	x		x		x
• Preparing systemwide budget request		x		x	x		x		x
• Preparing governor's budget request				x			x		x
• Legislative appropriation				x			x		x
• Allocating funds to institutions				x					x
• Allocating funds to projects				x					x
6. Standards or guidelines developed by:									
• Institutions	x	x			x				x
• State system body	x	x			x		x		x
• State building authority		x							
• Governor's office									
• Legislature									
• Outside Consultant	x								
• Joint Committee									
• Other									
7. Standards or guidelines have been used for more than 5 years	x	x			x		x		x
8. Standards or guidelines last updated:									
• within last 5 years		x		x			x		x
• 5-10 years	x								
• more than 10 years					x				
9. Standard or guidlines exist for:									
• Classrooms	x	x		x	x		x		x
• Teaching laboratories	x	x		x	x		x		x
• Research laboratories		x		x			x		x
• Office space	x	x		x	x		x		x
10. Institutions maintain space inventories by type of space	x	x	x	x	x	x	x	x	x
11. Institutions keep utilization records	x	x	x	x		x	x		x
12. Utilization studies are conducted	x	x	x	x	x	x	x		x

* Community Colleges Only

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3 Normalization Issues and Methodology

As expected, we found that the techniques and processes for determining higher education's facility needs differ significantly among the states,[a] in spite of the fact that many states appear to use similar standards, guidelines, formulas, etc. Thus, what often appears to be a comparable standard among states (e.g., weekly room use hours) may not be comparable at all due to differences in methods of counting enrollments. For example, some states exclude all evening enrollments in their calculations while most do not. Similarly, what appears to be a comparable research assignable square feet (ASF) per research faculty standard may not be comparable at all because one state counts only faculty on funded research projects while another also counts FTE faculty budgeted for "departmental research."

Similar issues exist in every part of the facilities budgeting process. Fortunately, however, the wide range of methodologies used by the different states does not mean that comparability cannot be achieved, but rather that extreme care must be taken to ensure comparability through normalization of the data.

3.1 Discussion of Normalization Issues

The following sections describe the major comparability issues and problems we discovered during our review of the facilities budgeting practices in the states and institutions that we visited. The discussions are intended to help the reader understand:

- the types of normalization adjustments which must be made;
- the reasons for the normalization methodology which we used;
- the relative magnitude of the various comparability issues; and
- the reasons why we were unable to correct for all differences among the states.

3.1.1 Enrollment Issues

Many differences exist in the ways in which institutions and states establish the enrollment counts that form the basis for determining enrollment related facility needs.

(1) *Definition of FTE Student* In spite of the fact that the definitions of full time-equivalent (FTE) student appear to be similar among the states, significant differences often exist. For example, one state may define 15 student credit hours (SCH) as a full-time-equivalent undergraduate student while another state utilizes 16. Some have an advanced graduate category for Ph.D. students with a different FTE definition than for master's and first professional degree students, while others do not.

Exhibit 3.1 shows the different FTE student definitions utilized by the selected states.

Fortunately, all of the states in our detailed review use weekly student contact hours (WSCH) rather than FTE students to drive the calculation of their scheduled classroom and teaching lab facility needs. For this reason, no adjustments in the standards/guidelines for classrooms and teaching labs are needed to reflect the differences in FTE definitions.

(2) *Enrollment Counting Time Period:* As shown in Exhibit 3.2, the states utilize several different periods of time for counting enrollments for determining facility needs. The time periods range from the fall semester to an academic year average to a 12-month average. The importance of the enrollment counting period is that fall enrollments tend to be about 7 percent higher than an academic year enrollment which, in turn, is about 10 percent higher than a 12-month average. Thus, when all other factors are equal, those states utilizing fall term enrollments calculate a higher facility need.

(3) *Enrollment Exclusions and Inclusions:* The most difficult of the enrollment counting problems, and hence the normalization process, is to determine which enrollments are included and excluded. The

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[a] The term "state" is used to refer to both the states and the Canadian Province of Ontario throughout this report.

EXHIBIT 3.1 Comparison of FTE Enrollment Definitions (Student Credit Hours, SCH)

STATE	LOWER	UPPER	GRAD. I	GRAD. II
California				
Community Colleges	Do not define FTE student. All calculations based on student contact hours.	N/A	N/A	N/A
California State University	15 SCH per term	15 SCH per term	15 SCH per term	N/A
University of California	15 SCH per term	15 SCH per term	Headcount	Headcount
Colorado	15 SCH per term	15 SCH per term	12 SCH per term	12 SCH per term
Florida				
University System				
Academic (Fall & Spring)	15 SCH per term	15 SCH per term	12 SCH per term	12 SCH per term
(Summer)	10 SCH per term	10 SCH per term	8 SCH per term	8 SCH per term
Vocational	Based on Student Contact Hours	---		
Kansas	15 SCH per term	15 SCH per term	9 SCH per term	9 SCH per term
Maryland	15 SCH per term	15 SCH per term	12 SCH per term	12 SCH per term
Nebraska	12 SCH per term	12 SCH per term	9 SCH per term	9 SCH per term
New Hampshire[a]	15 SCH per term	15 SCH per term	12 SCH per term	12 SCH per term
New Jersey	32 SCH per ac year	32 SCH per ac year	24 SCH per ac year	24 SCH per ac year
New York	15 SCH per term	15 SCH per term	12 SCH per term	12 SCH per term
Ohio	15 SCH per term	15 SCH per term	12 SCH per term	12 SCH per term
Oklahoma	15 SCH per term	15 SCH per term	12 SCH per term	12 SCH per term
Ontario	Varies by institution	Varies by institution	Varies by institution	Varies by institution
Oregon	15 SCH per term	15 SCH per term	9 SCH per term	9 SCH per term
Tennessee	15 SCH per term	15 SCH per term	12 SCH per term	12 SCH per term
Utah	15 SCH per term	15 SCH per term	12 SCH per term	12 SCH per term
Virginia	30 SCH per Ac. Yr.	30 SCH per Ac. Yr.	24 SCH per Ac. Yr.	24 SCH per Ac. Yr.
Washington				
Community Colleges	45 SCH per Ac. Yr. plus Summer Term divided by 45	NA	NA	NA
Wisconsin	15 SCH per term	15 SCH per term	9 SCH per term	varies by discipline

a. New Hampshire does not have a standard definition for student credit hours. Fifteen and 12 were used as approximate values.

EXHIBIT 3.2 Comparison of Enrollment Counting Period Used for Facility Budgeting

State	Enrollment Counting Period
California	Academic Year Average
Colorado	Academic Year Average
Florida	Three Terms[a]
Kansas	Fall Term
Maryland	Fall Term
Nebraska	Fall Term
New Hampshire	Fall Term
New Jersey	Academic Year Average
New York	Fall Term
Ohio	Fall Term
Oklahoma	Full Year Total
Ontario	Academic Year Average
Oregon	Fall Term
Tennessee	Fall Term
Utah	Fall Term
Virginia	Academic Year Average
Washington (Community Colleges)	Sum of four quarter enrollments divided by three
Wisconsin	Fall Term

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a. Total SCH for Summer, Fall and Spring terms are used to calculate Annual FTE. Undergraduate SCH are divided by 40 and graduate SCH are divided by 32.

normalization problem is created by the fact that many of the enrollments which are excluded for the purpose of determining facility needs are enrollments in courses which, by public policy, are often not funded by public funds. Examples of such courses are avocation and recreation courses. The problems stem from the following different situations:

- Some states recognize avocation and recreation courses as being programs that should be funded by the state and, hence, do not maintain a separate count of the enrollments. The result is that the enrollments are included in their enrollment counts and no information exists to exclude them.
- Other states do not fund such enrollments but do allow their public institutions to offer such courses on a fee basis (e.g., fees pay all operating costs). These states specifically exclude such enrollments from their facilities enrollment count.
- Other states prohibit their public institutions from teaching such courses.

There is another set of enrollments which are excluded in some states in the determination of facility needs and which are usually relatively easy to identify. This set includes those enrollments for which the states, through policy decisions, do not provide facilities. These enrollments may include:

- Off-campus courses:
  - in borrowed facilities
  - in rented facilities
- Intern and practice teaching courses
- Outdoor physical education courses
- Individual study courses
- ROTC courses

Exhibit 3.3 shows the types of enrollments excluded from the facilities enrollment count in the selected states. In spite of the many differences among the enrollments included/excluded in the facility enrollment base, we determined, after extensive review that no adjustments should be made in the state standards/guidelines for enrollment inclusions/exclusions. The reasons for this decision were:

- The magnitude of the adjustments would be extremely small, ranging from 0 to 3 percent.
- We were unable, in many states, to obtain sufficient data to identify the percentage of enrollments in the various exclusion categories.
- Those states where we did obtain data supported the conclusion that these exclusion categories are an extremely small percentage of total enrollments.

We have, however, provided sufficient information in this report for the reader to understand the issues involved in enrollment exclusions/inclusions and to understand the general order of magnitude and direction of adjustments of the states' standards/guidelines that would be necessary to normalize for enrollment inclusions and exclusions.

(4) *Daytime Versus Evening Enrollments:* Five states -- Colorado, Maryland, Tennessee, Washington and Ontario -- base their facility needs determination on daytime enrollments (except for institutions with evening enrollment greater than daytime enrollments) and have adopted standards and guidelines consistent with their enrollment count-

EXHIBIT 3.3 Comparison of Facilities Enrollment; Exclusions Among the Selected States

State	Enrollments Excluded
California	
Community Colleges	All avocation and non-credit recreation courses. Off-campus courses.
California State University	Outdoor physical education courses.
University of California	Off-campus intern and practice teaching courses. Outdoor physical education courses. Off-campus intern and practice teaching courses.
Colorado	Evening and weekend courses. Avocation and recreation courses. Outdoor physical education courses. Courses taught in borrowed or leased space.
Florida	
Universities	ROTC courses. Non-credit courses. Off-campus courses.
Community Colleges	Recreation courses. Avocation courses.
Kansas	Individual study courses. Off-campus internships. Practice teaching.
Maryland	Evening courses. Weekend courses. Avocation courses. Recreation courses. Off campus internships. Practice teaching. Off-campus in borrowed space. Off-campus in rented space.
Nebraska	Off-campus internships. ROTC courses. Outdoor PE courses. Remedial courses. Off campus courses in borrowed space. Off campus courses in rented space.
New Hampshire	By policy, students who do not require on-campus space.
New Jersey	Outdoor physical education courses.
New York	Evening courses. Weekend courses. Off-campus internships.
Ohio	None.
Oklahoma	All non-credit enrollments.
Ontario	Undergraduate students who have exceeded government's funding limit. Evening courses.
Oregon	Off-campus internships. Practice teaching.
Tennessee	Evening courses. Off-campus internships. Off-campus courses in borrowed space.
Utah	Weekend courses. Off-campus internships. ROTC courses.
Virginia	Avocation courses. Recreation courses. Off-campus internships. Practice teaching.
Washington	Evening courses. Weekend courses Avocation courses Recreation courses
Wisconsin	Off-campus internships

ing policy. All of the other selected states, including California, utilize total enrollments within a 24-hour period. Therefore, adjustments were made in the case of the five states utilizing only daytime enrollments.[a]

3.1.2 *Staffing Data Issues*

We found that most of the facility budgeting techniques of the selected states allot certain amounts of staff-related space (e.g., offices, conference rooms, research labs, etc.) on a per staff member basis with different parameters for different types of space, different types of staff, and different disciplines of staff assignment. Unfortunately, however, we found that the states do not use the same definitions of staff positions nor do they use the same mathematical methodologies to determine need. For example:

- Some states do not, as a matter of policy, include contract and grant faculty and staff in calculating space needs; other states do.
- Some states calculate a need for research lab space for "departmental research" based on faculty effort reports while others only recognize a need for research lab space for designated research positions.
- Some states recognize a need for office and lab space for graduate and postdoctoral students, while others do not.
- Some states determine need based upon the number of faculty alone while others have a methodology which recognizes a different level of need for each type of staff (e.g., faculty, academic administration, clerical, etc.).

Exhibit 3.4 shows the demand units (usually employee positions) used to determine office space needs among the surveyed states, and Exhibit 3.5 shows the demand units used to determine research laboratory needs among the surveyed states.

3.1.3 *Space Standards Issues*

The facility budgeting standards/guidelines in all the surveyed states have been designed to ensure mathematical consistency with the enrollment and staff data upon which the calculations are based. For example:

- If evening enrollments and classes are omitted from the enrollment data base, the room hours per week are likely to be lower (e.g., based on an 8:00 a.m. to 5:00 p.m. day for classrooms).
- If an annual FTE enrollment is used, all space standards are based on the same time frame to maintain mathematical consistency.
- If a different definition of enrollments is utilized, a different and consistent set of standards and guidelines are also utilized.

3.2 Need for Normalization

We found that each of the states had developed internally consistent standards/guidelines based upon its unique:

- policies governing programs and activities for which the state will provide facilities;
- policies governing data definitions; and
- methodologies which, based upon program and data definition policies, accurately determine the state's higher education facility needs.

Because states have designed standards and guidelines to be consistent with unique policies, definitions and methodologies, it is essential that a normalization process be utilized to establish comparability.

3.3 Establishment of Prototype Higher Education Systems

In addition to major differences among the states in their policies, data definitions and methodologies for determining facility needs, we also found that major differences existed in higher education programs. For example:

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[a] Adjustments have also been made for Ohio. Although they count both daytime and evening enrollments, different standards are applied. Therefore, we used Ohio's daytime standards, adjusted to 24 hour enrollments to be consistent with our analysis of other states.

EXHIBIT 3.4 Demand Unit Comparisons, Office Space

State	Demand Units Used as Basis to Determine Office Space Needs
California	
Community Colleges	All state-funded FTE instructional staff.
California State University	All state-funded FTE faculty.
University of California	All state-funded FTE academic staff. All state-funded graduate students.
Colorado	All FTE faculty. All graduate assistants. All secretarial/clerical staff.
Florida	
Universities	FTE enrollment, not positions.
Community Colleges	All FTE positions requiring office space.
Kansas	All academic staff. All graduate students. Postdoctoral students, if teaching.
Maryland	All academic staff. All graduate assistants. All other doctoral students.
Nebraska	All academic staff. All graduate assistants. All doctoral students. All postdoctoral students. All emeritus faculty.
New Hampshire	All executives. All faculty. All non-faculty professional. All clerical/technical staff. All graduate assistants.
New Jersey	All academic staff. All postdoctoral students.
New York	All academic staff. All graduate assistants.
Ohio	
Community Colleges	All academic staff.
Universities	All academic staff. All graduate assistants.
Oklahoma	FTE enrollments.
Ontario	All FTE faculty. All non-academic staff (except technicians). All graduate students.
Oregon	All academic staff. All teaching assistants. All other doctoral students.
Tennessee	Based on FTE enrollments.
Utah	All staff authorized to have office space.
Virginia	All FTE faculty.
Washington	
Community Colleges	FTE faculty based on enrollment/faculty ratio calculation.
Wisconsin	All academic staff. All graduate assistants. All postdoctoral students. All emeritus faculty. All administrative staff. All support staff. All classified staff.

EXHIBIT 3.5 Demand Unit Comparisons, Research Laboratory

State	Demand Units Used as Basis to Determine Research Laboratory Needs
California	
University of California	All state-funded FTE academic staff. All graduate students.
California State University	All graduate students.
Colorado	All faculty. All graduate students.
Florida	All FTE research faculty. All FTE graduate students.
Kansas	All FTE research faculty. All FTE graduate students.
Maryland	All FTE faculty in an academic department with a master's or a doctoral program or who are assigned full time research loads. All FTE graduate students.
Nebraska	Adjusted headcount faculty positions. Adjusted headcount graduate students. Adjusted headcount postdoctoral fellows.
New Hampshire	All FTE research faculty. All FTE graduate students.
New Jersey	No research lab standards/guidelines.
New York	No research lab standards/guidelines.
Ohio	Percent of headcount faculty requiring research space at a given time. Percent of graduate students requiring research space at a given time.
Oklahoma	No research lab standards/guidelines.
Ontario	All FTE faculty. Non-faculty researchers. Graduate students.
Oregon	All FTE faculty. All graduate assistants. 33 percent of all other doctoral students.
Tennessee	No research lab standards.
Utah	All FTE faculties.
Virginia	All FTE faculty engaged in research. Graduate students.
Wisconsin	FTE faculty engaged in funded or unfunded research. Graduate students conducting funded or unfunded research. Doctoral degree candidates. Postdoctoral students conducting funded research.

- Some community college systems do not offer significant numbers of vocational education programs while others emphasize vocational education and training.
- Program emphasis varies widely. For example, some university systems have large science and engineering programs while others have larger humanities and education programs.
- Some university systems have larger research programs than others.
- Some systems recognize extension programs as a viable part of their mission while others do not.

Thus, the first major normalization methodology that we faced was "how can the differences in planning factors due strictly to the enrollment mix and program mix differences among the states be eliminated?"

The method we chose was to create three prototype state higher education systems:

(1) A prototype community college system

(2) A prototype state university system

(3) A prototype research university system

By applying each state' facility budgeting methodologies to each of the three prototype systems we could produce normalized data about the standards and guidelines in each state which were free from differences due to program or enrollment mixes. Thus, the normalized standards and guidelines for the selected states would be comparable within each prototype system. They would not be comparable across prototype systems because of program and enrollment profile differences among the three systems.

It is important for the reader to be aware that a different set of normalized data would result if the program and enrollment profiles of the prototype systems were altered. For the purposes of comparing California' systems to other states, we specifically designed the profiles of the three prototype systems to be similar, but not identical, to their California counterparts. In addition, we added certain data elements to the prototype systems (e.g., contract and grant faculty positions) to accommodate aspects of the other states' formulas.

3.4 Description of Prototype Systems

Assumptions about each of the three prototype systems were dictated by the different policies, data definitions, and methodologies employed by the surveyed states. For example, if a state excludes evening enrollments, we had to establish a daytime-/evening enrollment mix for the prototype. Thus, in deriving the assumed profile of each of the three prototype systems we had to first, carefully study the facilities budgeting techniques of each of the surveyed states and the Canadian province. We then designed a profile that would accommodate each state's methodology. Exhibits 3 6, 3.7 and 3.8 present the profiles of the three prototype systems.

3.5 Units of Comparison

Another normalization methodology issue that had to be resolved was the number and level of detail at which normalized data would be derived and presented. At one end of the spectrum we could, for example, derive a set of normalized teaching lab ASF/Weekly Student Contact Hours (WSCH) for each of the 17 survey states, each of the three prototype systems, each student level (4 for the university prototypes), and each of up to 30 discipline categories. This would yield up to 4,590 comparable numbers for just the teaching laboratory category (17x30 for community colleges plus 17x2x4x30 for the other two prototypes).

At the other end of the spectrum we could, utilizing the prototype system profiles, derive a normalized teaching lab ASF/WSCH for each state for each prototype system and or each student level which would yield 153 comparisons. We chose to present our normalized comparisons at this level, but at the same time, provide enough information in the report so that the reader could derive normalized comparisons at a discipline level if he or she so desires.

Exhibit 3.9 presents the units of comparison that we chose for each of the four categories of space and prototype higher education systems.

3.6 Methodological Steps in Normalizing

Having established the profiles of the three proto-

EXHIBIT 3.6 Prototype -- Community College System Profile

1. **Number of Districts: 70**

2. **Definition of Full-Time Equivalent Enrollments: Lower Division - 15 student credit hours per semester.**

3. **Full-time equivalent enrollments by term (includes all credit enrollments except correspondence and public television courses): Fall Semester: 675,900 Spring Semester: 587,464 Summer Term: 202,138 Total: 1,465,502**

4. **Fall Enrollments By District:**

District	FTE	District	FTE	District	FTE	District	FTE	District	FTE	District	FTE	District	FTE
1.	430	11.	2,730	21.	4,370	31.	5,610	41.	9,340	51.	12,480	61.	15,380
2.	650	12.	2,800	22.	4,390	32.	6,360	42.	9,360	52.	12,700	62.	15,860
3.	800	13.	3,080	23.	4,490	33.	6,800	43.	9,360	53.	12,740	63.	16,900
4.	1,040	14.	3,360	24.	4,680	34.	7,160	44.	9,500	54.	12,830	64.	21,060
5.	1,120	15.	3,910	25.	4,840	35.	7,370	45.	10,300	55.	12,950	65.	21,620
6.	1,300	16.	3,970	26.	4,870	36.	7,730	46.	11,010	56.	13,120	66.	22,850
7.	1,550	17.	4,060	27.	5,030	37.	8,090	47.	11,060	57.	13,350	67.	25,460
8.	2,060	18.	4,080	28.	5,190	38.	8,490	48.	11,430	58.	14,240	68.	27,520
9.	2,320	19.	4,210	29.	5,460	39.	8,740	49.	11,940	59.	14,370	69.	30,820
10.	2,400	20.	4,330	30.	5,480	40.	8,980	50.	11,980	60.	14,740	70.	65,300
											Total		675,900

5. **Daytime Versus Evening WSCH: Daytime - 60% Evening - 40%**

6. **Education and General FTE Faculty: 28,713**

7. **Academic Administrative and Support Staff: 2,871**

8. **Percentage of Enrollments By Discipline:**

Discipline	Proportion of Students	Discipline	Proportion of Students	Discipline	Proportion of Students
Agriculture	0.9%	Electricity	0.7%	Millwork	0.7%
Air Conditioning	0.3	Engineering	0.4	Painting	0.7
Architecture	0.0[a]	Fine and Applied Arts	7.3	Physical Sciences	3.5
Auto-Body and Fender	1.1	Foreign Language	2.3	Plastering	0.7
Auto-Mechanic	1.1	Glazing	0.7	Plastics	0.0[a]
Auto-Technology	1.1	Graphic Arts	7.3	Plumbing	0.7
Aviation Maintenance	0.5	Health Services	3.8	Psychology	2.4
Biological Sciences	3.0	Heavy Equipment	0.3	Public Affairs and Services	2.2
Business and Management	8.8	Home Economics	2.4	Refrigeration	0.3
Carpentry	0.7	Interdisciplinary	7.8	Roofing	0.7
Commercial Services	1.4	Letters	6.8	Small Engine Repair	1.1
Communications	0.7	Library Science	0.0	Social Sciences	6.4
Computer & Information Science	3.5	Machine Tools	1.1	Stationary Engineering	0.3
Diesel	0.3	Masonry	0.7	Welding	1.1
Dry-Wall	0.7	Mathematics	5.3		——
Education	7.9	Metal Trades	1.1	Total	100.00%[b]

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a. Less than .1 percent.

b. Detail does not add to total due to rounding.

EXHIBIT 3.7 Prototype -- State University System Profile

1. **Number of Institutions: 19**

2. **Definition of Full-Time Equivalent Enrollment: Lower Division: 15 student credit hours per semester. Upper Division: 15 student credit hours per semester. Graduate 1: 15 student credit hours per semester**

3. **Full-time equivalent enrollments by term and student level (includes all credit enrollments except correspondence and public television courses).**

	Academic Term			
Student Level	**Fall**	**Spring**	**Summer**	**Total Annual**
Lower	89,084	85,690	30,329	205,103
Upper	133,626	128,534	45,493	307,653
Graduate 1	36,255	34,874	14,443	85,572
Total	258,965	249,098	90,265	598,328

4. **Fall Enrollments by Institution:**

Campus	FTE	Campus	FTE	Campus	FTE	Campus	FTE	Campus	FTE
1.	3,500	5.	5,725	9.	13,700	13.	17,700	17.	21,200
2.	3,850	6.	7,200	10.	15,100	14.	18,800	18.	23,600
3.	4,500	7.	9,150	11.	15,100	15.	19,300	19.	26,600
4.	5,540	8.	13,600	12.	15,200	16.	19,600	Total	258,965

5. **Distribution of Daytime versus Evening Enrollments:**

	Percent of Enrollments		
Level	**Daytime**	**Evening**	**Total**
Lower	85	15	100
Upper	85	15	100
Graduate 1	80	20	100

6. **Education and General FTE Faculty: Lower Division: 4,252 Upper Division: 6,377 Graduate 1: 3,431 Total: 14,060**

7. **FTE Graduate Assistants: 1,160**

8. **Academic Administrative and Support Staff: 2,850**

9. **Contract and Grant Staff: Faculty: 583 Support: 58 Graduate Assistants: 100**

10. **Other academic related persons provided office space (e.g., Emeritus Faculty): 56**

11. **Discipline Mix: The enrollments in the prototype state university system for lower, upper and graduate students are assumed to be distributed among the discipline categories in the following percentages:**

Discipline

Agriculture	1.2%	Computer Science	2.6%	Humanities, General	10.7%
Anthropology	1.2	Education	6.4	Industrial Arts	1.0
Architecture	.6	Engineering	5.4	Journalism	.6
Area Studies	.6	Fine Arts	4.3	Mathematics	5.5
Art	2.4	Foreign Languages	2.6	Physical Science	5.4
Biological Science	3.9	Geography	1.4	Psychology	4.1
Broadcast Communication Arts	.5	Health Professions	3.7	Public Administration	2.4
Business Adm. and Economics	17.5	Health Science	.1	Social Sciences, General	12.7
Communications	1.7	Home Economics	1.5	Total	100.00%

EXHIBIT 3.8 Prototype -- Research University System Profile

1. **Number of Institutions: 8**

2. **Definition of Full-Time Equivalent Enrollment:**

   Lower Division: 15 student credit hours per semester.
   Upper Division: 15 student credit hours per semester.
   Graduate 1: 12 student credit hours per semester.
   Graduate 2: 12 student credit hours per semester.

3. **Full-time equivalent enrollments by term and student level (includes all credit enrollments except correspondence and public television courses).**

	Academic Term			
Student Level	**Fall**	**Spring**	**Summer**	**Total Annual**
Lower	44,594	41,919	14,380	100,893
Upper	66,891	62,878	21,570	151,339
Graduate 1	17,655	16,596	8,908	43,159
Graduate 2	8,815	8,286	4,447	21,548
Total	137,955	129,679	49,305	316,939

4. **Institutional Fall FTE Enrollments:**

   1: 28,175 2: 18,373 3: 13,988 4: 31,482 5: 6,101 6: 15,043 7: 16,098 8: 8,695 Total: 137,955

5. **Distribution of Daytime Versus Evening Enrollments:**

	Percent of Enrollments		
Level	**Daytime**	**Evening**	**Total**
Lower	90	10	100
Upper	85	15	100

	Percent of Enrollments		
Level	**Daytime**	**Evening**	**Total**
Graduate 1	90	10	100
Graduate 2	100	--	100

6. **State Funded FTE Faculty:** Lower Division: 2,455 Upper Division: 3,685 Graduate 1: 1,240 Graduate 2: 220 Total: 7,600

7. **State Funded FTE Graduate Assistants:** Teaching Assistants: 2,460 Research Assistants: 810

8. **State Funded Academic Administrative and Support Staff:** 6,600

9. **State Funded Research Technicians:** 720

10. **State Funded Post Doctoral Fellows:** 0

11. **Contract and Grant Positions:**
    Faculty: 350 Graduate Assistants: 170 Post Doctoral Fellows: 1,700 Technicians: 750 Clerical: 400

12. **Other Academic Related Persons Provided Office Space:** 500

13. **Percent of Education and General Faculty Time Spent on Research:** 30%

EXHIBIT 3.8 (continued)

14. **Discipline Mix: The enrollments, by level, and research staff in the prototype Research University System are assumed to be distributed among the discipline categories as follows:**

	Percent of Enrollments					Percent of Enrollments			
Discipline	Lower	Upper	Graduate	Research Staff[a]	Discipline	Lower	Upper	Graduate	Research Staff[a]
Administrative Sciences	0.9	2.0	8.7	2.8	Geography	1.1	1.0	0.6	0.8
Agricultural Biological Science	0.3	1.2	0.9	1.3	Journalism	0.0	0.1	0.3	0.1
Agricultural Economics	0.1	0.8	0.5	0.7	Law	0.0	0.3	9.0	1.6
Agricultural Sciences, General	0.6	2.1	4.4	6.7	Letters	19.9	12.0	6.6	12.6
Anthropology	2.5	2.0	1.7	1.7	Library Sciences	0.1	0.1	1.3	0.3
Architecture (Environmental Design)	0.3	1.2	2.8	1.5	Mathematics	13.0	4.1	3.2	6.5
Arts, Performing	4.4	5.2	3.4	4.6	Psychology	4.0	8.1	2.1	3.8
Arts, Visual	3.0	2.9	1.5	2.6	Social Ecology	0.4	0.9	0.3	0.5
Biological Sciences	6.2	7.3	5.3	7.0	Social Sciences, General	15.6	26.4	9.1	12.9
Computer Science	0.7	0.7	0.4	0.7	Social Welfare	0.0	0.1	1.6	0.4
Education	0.2	1.6	7.8	2.1	Studies, Applied Behavioral	0.3	0.4	0.2	0.2
Engineering Science	2.9	9.6	14.7	9.3	Studies, Environmental	0.1	0.4	0.2	0.3
Engineering, Agricultural	0.0	0.1	0.1	0.1	Studies, Interdisciplinary	0.8	1.8	0.1	1.2
Engineering, Chemical	0.0	0.2	0.6	0.3					
Foreign Languages	7.8	2.9	2.9	6.2	Total	100.0	100.0	100.0	100.0

a. Includes both faculty and other professional research staff.

15. **Contact hours per FTE student are assumed to be as follows[a]:**

	Classrooms			Teaching labs				Classrooms			Teaching labs		
Discipline	LD	UD	G	LD	UD	G[b]	Discipline	LD	UD	G	LD	UD	G[b]
Administration	14.6	14.5	13.3	6.3	5.3	3.0	Geography	13.8	13.7	8.2	6.3	5.4	2.0
Agricultural Biological Science	10.9	11.6	2.7	13.6	12.0	5.0	Journalism	13.9	14.2	12.8	14.7	14.4	3.0
Agricultural Economics	14.6	14.5	13.3	6.3	5.3	2.0	Law	13.9	14.2	12.8	14.7	14.4	3.0
Agricultural Science	11.2	11.6	2.6	13.2	11.9	5.0	Letters	18.9	15.0	15.0	0.0	0.0	0.0
Anthropology	12.8	13.1	8.2	8.1	6.5	2.0	Library Sciences	13.9	14.2	12.8	14.7	14.4	3.0
Architecture (Envrnmtal Design)	10.3	9.9	8.4	17.3	16.8	12.0	Mathematical Sciences	15.4	15.2	15.0	0.0	0.0	0.0
Arts, Performing	10.3	9.9	8.4	17.3	16.8	12.0	Physical Science	12.6	12.8	2.8	10.4	9.9	5.0
Arts, Visual	10.3	9.9	8.4	17.3	16.8	12.0	Psychology	12.8	13.1	8.2	8.1	6.5	2.0
Biological Sciences	10.5	11.5	2.8	14.0	12.1	5.0	Social Ecology	12.8	13.1	8.2	8.1	6.5	2.0
Computer Science	12.1	13.6	9.3	9.1	3.0	0.0	Social Sciences, General	15.0	14.6	13.5	2.1	0.8	1.0
Education	13.9	14.2	12.8	14.7	14.4	1.0	Social Welfare	15.0	14.6	13.5	2.1	0.8	1.0
Engineering Sciences	8.7	12.0	3.5	18.1	6.0	2.0	Studies, Applied Behav.	13.9	14.2	12.8	14.7	14.4	1.0
Engineering, Agricultural	8.7	12.0	3.5	18.1	6.0	2.0	Studies, Creative	18.9	15.0	15.0	0.0	0.0	0.0
Engineering, Chemical	10.7	12.4	3.2	14.3	8.0	3.0	Studies, Environ	10.5	11.5	2.8	14.0	12.1	5.0
Foreign Languages	18.9	15.0	15.0	0.0	0.0	0.0	Studies, Interdisciplinary	15.0	14.6	13.5	2.1	0.8	1.0

a. Contact hour distribution between classrooms and teaching labs is based on formula assumptions in space standards applying to the University of California.

b. The University of California standards include no allowance for graduate level teaching lab hours. The estimated contact hours per graduate FTE are included to normalize other states which do include such courses.

EXHIBIT 3.9 Units of Measurement for Comparisons of Normalized Data Among States

Prototype System	Classrooms	Teaching Labs	Research Labs	Academic Offices
Community Colleges	ASF/WSCH	ASF/WSCH	-	Total Office ASF
State University System	ASF/WSCH	ASF/WSCH	-	Total Office ASF
Research University System	ASF/FTE Student	ASF/FTE Student	Total Research Lab. ASF	Total Office ASF

type systems (Exhibits 3.6, 3.7 and 3.8) and the units of measurement for normalization (Exhibit 3.9), we then followed the procedures below in deriving comparable data:

Step 1: For classrooms and teaching labs we derived, utilizing the appropriate prototype profile data, a "Base Factor" (e.g., Square Feet/Weekly Student Contact Hours), where "Base Factor" is defined as the result of applying a state's formula to the proto-type institution without adjustments for different ways of counting demand units (e.g., enrollments).

This step involved the crosswalk of discipline-related data from each state's profile of discipline categories to the discipline categories of each of the prototype systems. Because of the wide range of discipline categories employed by the different states, ranging from none to over a hundred, we were often forced to exercise our professional judgment in making the crosswalks. While we know that other professionals might differ with us on some of the crosswalks, we believe that, because of the large number of disciplines involved, the impact on the final results would be insignificant.

Step 2: We then calculated the necessary adjustments to each state's "Base Factor" to account for differences in demand unit definitions and counting policies. We calculated adjustments to allow for differences in enrollment counting periods and exclusion of evening enrollments.

Step 3: We combined all of the adjustments to produce a comparable "Normalized Factor" unit for each state.

3.7 Description of Normalization Base

To the extent possible, we normalized the standards/guidelines to California's current methods of applying them. Thus, we adjusted the standards/guidelines of other states to reflect the use of:

- Academic Year average enrollments;
- ASF/WSCH for the Community Colleges and State University System classrooms and teaching laboratories;
- ASF/FTE student for the Research University Systems for classrooms and teaching laboratories; and
- The use of daytime plus evening enrollments.

3.8 Calculation of Adjustments

The calculation of adjustments made to the "Base Factors" of other states was based on the following mathematical concepts:

1. Basic Equation:

$U_i \bullet F_i = ASF_i$

Where: i = Space Category (ie., Classroom, Teaching Lab)
U_i = Demand Units
F_i = Space Factor (ASF/Demand Unit)
ASF_i = Total ASF of space needed

2. Example: Assume:

i = Classrooms
U_i = 5,000 WSCH
F_i = .65 ASF/WSCH
Then: (5,000) (.65) = 3,250 classroom ASF needed

3. Applying the above equation we used the respective prototype system as the basis for adjusting other states' standards to the California norm as illustrated in the following example:

State University System Prototype

California Norm: Uses Academic Year Average Lower Division Enrollment: 87,387

Other State: Uses Fall Lower Division Enrollment: 89,084

Other State Calculation: $89{,}084 F_i = ASF_i$

If the other state had to utilize an Academic Year enrollment instead of fall, its F_i would have to change to F_i' to generate the same amount of space as its current formula. F_i' can be calculated by considering the following two simultaneous equations:

$$89{,}084 F_i = ASF_i$$

$$87{,}387 F_i' = ASF_i$$

Solving for F_i': $87{,}387 F_i' = 89{,}084 F_i$

$$F_i' = \frac{89{,}084 F_i}{87{,}387}$$

$$F_i' = 1.02 F_i$$

Thus, in this case, the other states ASF/WSCH for classrooms would have to be increased by 2 percent to adjust for the fact that the other state uses a fall rather than an academic year average enrollment.

We utilized the above mathematical concept in adjusting for all enrollment counting periods and definitions among the states. For ease of understanding the results of these calculations, the following adjustment rules apply:

1. If the other state utilizes a *higher* enrollment counting norm or definition than the norm (e.g., fall versus academic year average enrollment), the other state's "Base Factor" must be adjusted *upwards*.
2. If the other state utilizes a *lower* enrollment counting or definition than the norm (e.g., a 12-month average versus an academic year average enrollment), the other state's "Base Factor" must be adjusted *downward*.

Appendix A at the end of this report presents a detailed explanation of the calculation of adjustment factors for enrollment counting differences and daytime/evening enrollments.

4 Standards/Guidelines for Classrooms

All states having space standards/guidelines reported using them for classrooms. This wider use is due to the fact that classroom standards tend to be less complex than the standards for other types of space, such as teaching and research laboratories.

4.1 The Classroom Formula

All of the 18 states in our on-site survey utilized one of the following similar classroom formulas to derive their classroom standards/guidelines.

Formula A:

$$\frac{\text{SSS}}{(\text{WRH})\,(\text{SOR})} = \frac{\text{ASF}}{\text{WSCH}}$$

Formula B:

$$\frac{\text{WSCH}}{\text{FTE}} \bullet \frac{\text{SSS}}{(\text{WRH})(\text{SOR})} = \frac{\text{ASF}}{\text{FTE}}$$

Where:

SSS = Student Station Size (ASF per station)

WRH = Weekly Room Hours (Hours classrooms are assumed to be used)

SOR = Station Occupancy Rate (Percent of stations assumed to be occupied when classroom is used)

ASF = Assignable Square Feet

WSCH = Weekly Student Contact Hour (An hour of scheduled student instruction)

FTE = Full-Time Equivalent Student

4.2 Variations in Formula Standards/Guidelines

Although all of the surveyed states utilized a similar classroom formula, many of them varied the values of the standards in the formula to recognize unique situations in their states. These unique situations included items such as:

- different standards for different size institutions
- different standards for daytime versus evening enrollments
- different standards for different levels of instruction
- different standards for different discipline categories

The result of these variations is that extra steps had to be taken to adjust the standards of some states prior to making any comparisons.

4.3 Classroom Standards/Guidelines in the Surveyed States

Exhibit 4.1 shows the unadjusted classroom standards/guidelines utilized by the surveyed states. The reader is cautioned that the factors in Exhibit 4.1 are not comparable for several reasons including:

- Some student station sizes (SSS) include classroom support space and some do not.
- The different states multiply the resulting ASF/WSCH by a wide range of enrollment counts, including:
  - fall enrollments;
  - academic year average enrollments;
  - modified 12-month average enrollments;
  - the sum of enrollments in all terms in a 12-month period;
  - daytime enrollments only; and/or
  - daytime plus evening enrollments.

It is important to reiterate that all of the states utilize the same types of standards. However, the value of the standards have been designed to fit the unique program and operating policies, data definitions and enrollment counting periods in each state.

EXHIBIT 4.1 Comparison of Unadjusted Standards/Guidelines for Classrooms Among the Surveyed States

				Classroom Standards		
State	Institution	Size or Characteristic	WRH (Hours)	SOR (Percent)	SSS (ASF)	ASF/ WSCH
California	Community Colleges		53.0	66.0	15.0	.429
	California State University		53.0	66.0	15.0	.429
	University of California		53.0	66.0	15.0	.429
Colorado			30.0	67.0	15.0	.746
Florida	Community Colleges	≤2,500 enrollments	58.5	55.0	25.0	.777
		≥2,500 enrollments	58.5	60.0	25.0	.712
	Universities		58.5	60.0	22.0	.627
Kansas			30.0	60.0	15.0	.833
Maryland[a]	Universities	≤3,000 FTE enrollments	30.0	60.0	17.6	.978
		3,000-6,000 FTE enrollments	30.0	65.0	17.6	.903
		≥6,000 FTE enrollments	30.0	70.0	17.6	.838
	Community Colleges	≤1,000 FTE enrollments	30.0	60.0	16.3	.906
		1,000-2,499 FTE enrollments	31.0	62.5	16.3	.841
		2,500-4,999 FTE enrollments	32.0	62.5	16.3	.815
		≥5,000 FTE enrollments	33.0	65.0	16.3	.760
Nebraska			30.0	65.0	16.0	.821
New Hampshire			30.0	60.0	16.0	.889
New Jersey			34.0	70.0	16.0	.672
New York	CUNY	Typical Classroom	30.0	60.0	16.0	.889
		Large Lecture Halls	20.0	60.0	12.0	.667
Ohio	Technical Colleges		31.5	67.0	18.0	.852
	Community Colleges		31.5	67.0	17.0	.805
	Universities		31.5	67.0	15.0	.711
Oklahoma[b]		≤1,000 enrollments	54.0	80.0	16.0	.370
		1,000-2,999 enrollments	57.0	80.0	16.0	.351
		≥3,000 enrollments	60.0	80.0	16.0	.333
Oregon			33.0	60.0	15.0	.758
Tennessee			30.0	67.0	15.0	.746
Utah	University		34.0	67.0	16.0	.706
	Masters Degree/Four-Year Institutions		34.0	67.0	16.5	.728
	Community Colleges		34.0	67.0	17.0	.750
Virginia	Two Year Institutions	≤1,000 enrollment	30.0	62.5	16.0	.853
		1,000-2,499 enrollment	31.0	65.0	16.0	.794
		≥2,500 enrollment	32.0	65.0	15.0	.721
	Comprehensive Colleges	≤2,500 enrollment	30.0	62.5	16.0	.853
		≥2,500 enrollment	31.0	60.0	15.0	.806
	Doctoral Granting Institutions		30.0	60.0	15.0	.833
Washington	Community Colleges (Academic)	≤1,000 enrollment	NA	NA	NA	.794
		≥1,000 enrollment	33.0	70.0	18.0	.779
	Community Colleges (Voc. Ed.)	≤1,000 enrollment	NA	NA	NA	.811
		≥1,000 enrollment	33.0	70.0	18.0	.779
Wisconsin			30.0	67.0	16.0	.796
Ontario			30.0	62.0	15.0	.806

a. University of Baltimore is calculated on the basis of evening enrollments only using a WRH of 20 per week.

b. Factors based on three term sum of student WSCH.

4.4 Normalized Classroom Standards in the Surveyed States

Exhibits 4.2, 4.3 and 4.4 present the normalized classroom space factors for each state based upon the profile of each prototype system.

Normalized factors include allowances for support storage space. It needs to be emphasized again that the comparisons in Exhibits 4.2, 4.3 and 4.4 would be significantly different for a significantly different prototype university system. Thus, readers in states other than California should be extremely careful in drawing conclusions about the relative rank of the standards/guidelines in their states from the exhibits.

Information for California is presented in bold type at the bottom of each exhibit. Mean and median averages have been calculated for all states' factors excluding California. This information is found just above the results for California on each page. Finally, we have listed the ranking for California to show where the State's normalized space factor falls

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EXHIBIT 4.2 Comparison of ASF/WSCH for Classrooms Among the Surveyed States

Prototype System: *Community Colleges*
Student Level: *Lower Division*

	ASF/WSCH				
		Increase (Decrease) Due To:			
State	Base Factor[a]	Enrollment Counting Period[b]	Daytime vs. Evening Enrollments[b]	Normalized Factor	
Colorado	.746		(.298)	.448	
Florida	.712	(.093)		.619	
Kansas	N/A				
Maryland	.767	.055	(.307)	.515	
Nebraska	N/A				
New Hampshire	N/A				
New Jersey	.672			.672	
Ohio	.824	.058	(.330)	.552	
Oklahoma	N/A				
Ontario, Canada	N/A				
Oregon	N/A				
Tennessee	.746	.052	(.298)	.500	
Utah	.750	.053		.803	
Virginia	.727			.727	
Washington	.783	.084	(.312)	.555	
Wisconsin	.796	.056		.852	
Mean (Excluding California)				.624	
Median (Excluding California)				.555	
					Rank
California	**.429**			**.429**	**11/11**

a. The weighted average ASF/WSCH taken from the appropriate exhibits in Volume II.

b. Derived by applying the appropriate percentage adjustment from Appendix A.

N/A = Not applicable either because state has no community colleges or, if it does, no community college standards/ guidelines exist.

EXHIBIT 4.3.1 Comparison of ASF/WSCH for Classrooms Among the Surveyed States

Prototype System: *State University System*
Student Level: *Lower Division*

		ASF/WSCH			
		Increase (Decrease) Due To:			
State	Base Factor[a]	Enrollment Counting Period[b]	Daytime vs. Evening Enrollments[c]	Normalized Factor	
Colorado	.746		(.112)	.634	
Florida	.627	(.076)		.551	
Kansas	.833	.016		.849	
Maryland	.843	.016	(.126)	.733	
Nebraska	.821	.016		.837	
New Hampshire	.889	.017		.906	
New Jersey	.672			.672	
Ohio	.711	.014	(.107)	.618	
Oklahoma	.333	.434		.767	
Ontario, Canada	.806		(.121)	.685	
Oregon	.758	.014		.772	
Tennessee	.746	.014	(.112)	.648	
Utah	.728	.014		.742	
Virginia	.806			.806	
Wisconsin	.796	.015		.811	
Mean (Excluding California)				.735	
Median (Excluding California)				.737	
					Rank
California	.462			.462	16/16

a. The weighted average ASF/WSCH taken from the appropriate exhibits in Volume II.

b. Derived by applying the appropriate percentage adjustment from Appendix A.

in relation to other states. The state whose normalized space factor would generate the most ASF would be ranked 1/11, for example, while the state whose normalized space factor would generate the least ASF would be ranked 11/11.

4.5 Summary of Findings About Classroom Standards/Guidelines

All states which use standards or guidelines for classrooms apply a similar formula to determine space needs based on four assumptions or objectives:

1. The number of hours per week the classrooms are assumed to be available for scheduled instruction. Most states assume 45 hours; the period of 8 a.m. to 5 p.m. In California, the assumption is 70 hours per week, or 8 a.m. to 10 p.m.
2. The percent of time the classrooms are expected to be scheduled. This normally ranges from 67 to 75 percent. This percent is applied to the

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EXHIBIT 4.3.2 Comparison of ASF/WSCH for Classrooms Among the Surveyed States

Prototype System: *State University System*
Student Level: *Upper Division*

	ASF/WSCH				
		Increase (Decrease) Due To:			
State	Base Factor[a]	Enrollment Counting Period[b]	Daytime vs. Evening Enrollments[b]	Normalized Factor	
Colorado	.746		(.112)	.634	
Florida	.627	(.076)		.551	
Kansas	.833	.016		.849	
Maryland	.843	.016	(.126)	.733	
Nebraska	.821	.016		.837	
New Hampshire	.889	.017		.906	
New Jersey	.672			.672	
Ohio	.711	.014	(.107)	.618	
Oklahoma	.333	.434		.767	
Ontario, Canada	.806		(.121)	.685	
Oregon	.758	.014		.772	
Tennessee	.746	.014	(.112)	.648	
Utah	.728	.014		.742	
Virginia	.806			.806	
Wisconsin	.796	.015		.811	
Mean (Excluding California)				.735	
Median (Excluding California)				.737	
					Rank
California	.467			.467	16/16

a. The weighted average ASF/WSCH taken from the appropriate exhibits in Volume II.

b. Derived by applying the appropriate percentage adjustment from Appendix A.

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hours rooms are assumed to be available, Item 1. above, to calculate Weekly Room Hours (WRH).

3. The percent of time that student stations in the classroom are expected or assumed to be occupied. (Station Occupancy Rate or "SOR") Our survey indicates that 60 to 70 percent is the normal range.
4. The average student station size (SSS). This is usually 15 to 18 square feet and includes allowances for the instructor, circulation space, etc.

Station size is based on averages of room sizes, assumptions as to methods of teaching, etc.

Once these assumptions or objectives are determined, a space factor is calculated and applied to projected enrollments in order to estimate space requirements. Most states reported using fall enrollments as their base for estimating space need. California uses an academic year average which normally is lower than fall term figures.

The assumptions in the California standards do not vary by type or size of institution. The standards/

EXHIBIT 4.3.3 Comparison of ASF/WSCH for Classrooms Among the Surveyed States

Prototype System: *State University System*
Student Level: *Graduate I*

	ASF/WSCH				
		Increase (Decrease) Due To:			
State	Base Factor[a]	Enrollment Counting Period[b]	Daytime vs. Evening Enrollments[b]	Normalized Factor	
Colorado	.746		(.112)	.634	
Florida	.627	(.062)		.565	
Kansas	.833	.016		.849	
Maryland	.843	.016	(.169)	.690	
Nebraska	.821	.016		.837	
New Hampshire	.889	.017		.906	
New Jersey	.672			.672	
Ohio	.711	.014	(.142)	.583	
Oklahoma	.333	.468		.801	
Ontario, Canada	.806		(.161)	.645	
Oregon	.758	.014		.772	
Tennessee	.746	.014	(.149)	.611	
Utah	.728	.014		.742	
Virginia	.806			.806	
Wisconsin	.796	.015		.811	
Mean (Excluding California)				.728	
Median (Excluding California)				.716	
					Rank
California	.467			.467	16/16

a. The weighted average ASF/WSCH taken from the appropriate exhibits in Volume II.

b. Derived by applying the appropriate percentage adjustment from Appendix A.

guidelines used by seven states, (Florida, Maryland, Ohio, Oklahoma, Utah, Virginia and Washington) differentiate in their utilization or station size assumptions by either type or size of institution.

California's space standards produce the smallest amount of square feet per FTE student or Weekly Student Contact Hour of any of the states for any of the types of institutions surveyed. This is due to two factors. First, the assumed room use (WRH) is substantially higher in California, 53 hours per week compared to the 30 to 35 hours assumed in most other states. Second, the average student station size (SSS) in California is smaller. California allows 15 ASF while the norm ranges from 15 to 18 ASF.

EXHIBIT 4.4.1 Comparison of ASF/FTE for Classrooms Among the Surveyed States

Prototype System: *Research University System*
Student Level: *Lower Division*

	ASF/FTE				
		Increase (Decrease) Due To:			
State	Base Factor[a]	Enrollment Counting Period[b]	Daytime vs. Evening Enrollments[b]	Normalized Factor	
Colorado	10.98		(1.10)	9.88	
Florida	9.22	(1.16)		8.06	
Kansas	12.27	.38		12.65	
Maryland	12.42	.39	(1.24)	11.57	
Nebraska	12.08	.37		12.45	
New Hampshire	13.08	.41		13.49	
New Jersey	9.89			9.89	
Ohio	10.46	.32	(1.05)	9.73	
Oklahoma	4.91	6.54		11.45	
Ontario, Canada	11.87		(1.19)	10.68	
Oregon	11.15	.35		11.50	
Tennessee	10.98	.34	(1.10)	10.22	
Utah	10.38	.32		10.70	
Virginia	12.27			12.27	
Wisconsin	11.72	.36		12.08	
Mean (Excluding California)				11.11	
Median (Excluding California)				11.07	
					Rank
California	6.73			6.73	16/16

a. The weighted average ASF/FTE taken from the appropriate exhibits in Volume II.

b. Derived by applying the appropriate percentage adjustment from Appendix A.

EXHIBIT 4.4.2 Comparison of ASF/FTE for Classrooms Among the Surveyed States

Prototype System: ***Research University System***
Student Level: ***Upper Division***

	ASF/FTE				
		Increase (Decrease) Due To:			
State	Base Factor[a]	Enrollment Counting Period[b]	Daytime vs. Evening Enrollments[b]	Normalized Factor	
Colorado	9.98		(1.50)	8.48	
Florida	8.39	(1.06)		7.33	
Kansas	11.15	.34		11.49	
Maryland	11.29	.35	(1.69)	9.95	
Nebraska	10.98	.34		11.32	
New Hampshire	11.89	.37		12.26	
New Jersey	8.99			8.99	
Ohio	9.51	.29	(1.43)	8.37	
Oklahoma	4.46	5.94		10.40	
Ontario, Canada	10.79		(1.62)	9.17	
Oregon	10.13	.54		10.44	
Tennessee	9.98	.31	(1.50)	8.79	
Utah	9.44	.29		9.73	
Virginia	11.15			11.15	
Wisconsin	10.65	.33		10.98	
Mean (Excluding California)				9.92	
Median (Excluding California)				9.84	
					Rank
California	6.16			6.16	16/16

a. The weighted average ASF/FTE taken from the appropriate exhibits in Volume II.

b. Derived by applying the appropriate percentage adjustment from Appendix A.

EXHIBIT 4.4.3 Comparison of ASF/FTE for Classrooms Among the Surveyed States

Prototype System: *Research University System*
Student Level: *Graduate 1*

	ASF/FTE				
		Increase (Decrease) Due To:			
State	Base Factor[a]	Enrollment Counting Period[b]	Daytime vs. Evening Enrollments[b]	Normalized Factor	Rank
Colorado	6.82		(.68)	6.14	
Florida	5.73	(.40)		5.33	
Kansas	7.62	.24		7.86	
Maryland	7.71	.24	(.77)	7.18	
Nebraska	7.50	.23		7.73	
New Hampshire	8.12	.25		8.37	
New Jersey	6.14			6.14	
Ohio	6.49	.20	(.65)	6.04	
Oklahoma	3.05	4.53		7.58	
Ontario, Canada	7.37		(.74)	6.63	
Oregon	6.92	.21		7.13	
Tennessee	6.82	.21	(.68)	7.03	
Utah	6.45	.20		6.65	
Virginia	7.62			7.62	
Wisconsin	7.27	.22		7.49	
Mean (Excluding California)				6.99	
Median (Excluding California)				7.08	
California	4.23			4.23	16/16

a. The weighted average ASF/FTE taken from the appropriate exhibits in Volume II.

b. Derived by applying the appropriate percentage adjustment from Appendix A.

EXHIBIT 4.4.4 Comparison of ASF/FTE for Classrooms Among the Surveyed States

Prototype System: *Research University System*
Student Level: *Graduate 2*

	ASF/FTE				
		Increase (Decrease) Due To:			
State	Base Factor[a]	Enrollment Counting Period[b]	Daytime vs. Evening Enrollments[b]	Normalized Factor	
Colorado	6.82			6.82	
Florida	5.73	.11		5.84	
Kansas	7.62	.24		7.86	
Maryland	7.71	.24		7.95	
Nebraska	7.50	.23		7.73	
New Hampshire	8.12	.25		8.37	
New Jersey	6.14			6.14	
Ohio	6.49	.20		6.69	
Oklahoma	3.05	5.25		8.30	
Ontario, Canada	7.37			7.37	
Oregon	6.92	.21		7.13	
Tennessee	6.82	.21		7.03	
Utah	6.45	.20		6.65	
Virginia	7.62			7.62	
Wisconsin	7.27	.22		7.49	
Mean (Excluding California)				7.27	
Median (Excluding California)				7.30	
					Rank
California	4.23			4.23	16/16

a. The weighted average ASF/FTE taken from the appropriate exhibits in Volume II.

b. Derived by applying the appropriate percentage adjustment from Appendix A.

5

Standards/Guidelines for Teaching Laboratories

Fifteen of the eighteen states surveyed during this study have teaching laboratory standards for analysis that exist in a form that can be compared to California's standards.

5.1 The Teaching Laboratory Formula

All of the 15 states which utilize teaching laboratory standards/guidelines have adopted some form of one of the following formulas (which are expressed in the same general form as the classroom formulas presented in Chapter 4):

Formula A: $$\frac{SSS}{(WRH)\ (SOR)} = \frac{ASF}{WSCH}$$

Formula B: $$\frac{WSCH}{FTE} \bullet \frac{SSS}{(WRH)(SOR)} = \frac{ASF}{FTE}$$

Where:

SSS = Student Station Size (ASF per station)

WRH = Weekly Room Hours (Hours classrooms are assumed to be used)

SOR = Station Occupancy Rate (Percent of stations assumed to be occupied when classroom is used)

ASF = Assignable Square Feet

WSCH = Weekly Student Contact Hour (An hour of scheduled student instruction)

FTE = Full-Time Equivalent Student

5.2 Variations in Formula Standards/Guidelines

Unlike the standards/guidelines for classrooms, the standards/guidelines for teaching laboratories tend to be more complex in recognition of the wide range of facility needs for laboratories; ranging from relatively simple needs in the social sciences to very complex needs in engineering. As a result, the states have developed a wide range of approaches to the establishment of standards/guidelines for teaching laboratories. The approaches include:

- different student station sizes for different discipline groupings;
- different weekly room use hours by size of institution; and
- different student station sizes by level of institution.

Just as in the case of classrooms, the above and other variations in approaches by the states require that significant adjustments be made in most states' teaching laboratory standards/guidelines to produce comparable data.

5.3 Unadjusted Teaching Laboratory Standards/Guidelines in the Surveyed States

Exhibit 5.1.1 shows the *unadjusted* teaching lab standards/guidelines utilized by the states surveyed. The reader is cautioned that the factors in Exhibit 5.1.1 are not comparable for the following reasons including:

- Some student station sizes (SSS) include support space and some do not.
- The different states multiply the resulting ASF/WSCH by a wide range of enrollment counts, including:
  - -- fall enrollment;
  - -- academic year average enrollments;
  - -- modified 12 month average enrollments;
  - -- the sum of enrollments in all terms in a 12-month period;
  - -- daytime enrollments only; and/or
  - -- daytime plus evening enrollments.

(text continued on page 60)

EXHIBIT 5.1.1 Comparison of Unadjusted Teaching Lab Standards/Guidelines Among the Surveyed States

State	WRH (Hours)	SOR (Percent)	SSS (ASF)	ASF/ WSCH
California				
Community Colleges	27.5	85.0	See Ex. 5.1.1	a
California State University				
Lower	27.5	85.0	See Ex. 5.1.2	a
Upper	22.0	80.0	See Ex. 5.1.2	a
University of California				
Lower	27.5	85.0	See Ex. 5.1.3	a
Upper	22.0	80.0	See Ex. 5.1.3	a
Colorado				
Academic Labs	20.0	80.0	See Ex. 5.1.4	a
Vocational Labs	30.0	80.0	See Ex. 5.1.4	a
Florida				
Community Colleges				
Academic Labs				
≤ 2500	21.0	80.0	See Ex. 5.1.5	a
≥ 2500	24.0	80.0	See Ex. 5.1.5	a
Occupational Lab				
VocTech College	36.0	68.0	See Ex. 5.1.5	a
Non-VocTech College	36.0	68.0	See Ex. 5.1.5	a
Universities				
Lower	24.0	80.0	See Ex. 5.1.6	a
Upper	20.0	80.0	See Ex. 5.1.6	a
Graduate	20.0	80.0	See Ex. 5.1.6	a
Kansas	20.0	80.0	See Ex. 5.1.7	a
Maryland				
Community Colleges				
≤ 1000	20.0	75.0	60.0	4.00
1000-2499	21.0	80.0	60.0	3.57
2500-4999	22.0	80.0	60.0	3.41
≥ 5000	23.0	80.0	60.0	3.26
Universities				
≤ 3000	21.0	78.7	86.4	5.23
3001-6000	21.0	78.7	79.2	4.80
≥ 6000 FTE	21.0	78.7	72.0	4.36
Nebraska	20.0	65.0	See Ex. 5.1.8	a
New Hampshire				
Lower	24.0	70.0	See Ex. 5.1.9	a
Upper	18.0	70.0	See Ex. 5.1.9	a
New Jersey	24.0	80.0	See Ex. 5.1.10	a
New York (CUNY)	24.0	80.0	See Ex. 5.1.11	a
Ohio				
Universities (Daytime)	22.5	80.0	See Ex. 5.1.12	a
Community Colleges		Not Available		
Oklahoma	48.0	80.0	See Ex. 5.1.13	a
Oregon				
Lower	22.0	80.0	See Ex. 5.1.14	a
Upper	16.0	75.0	See Ex. 5.1.14	a
Tennessee				
Lower	24.0	80.0	60.0	3.12
Upper and Graduate	18.0	80.0	60.0	4.17
Utah				
Community College	24.0	80.0	65.0	3.39
Masters Degree/Four-Year	24.0	80.0	65.0	3.39
University	24.0	80.0	65.0	3.39
Virginia				
Two-Year Institutions				
Heavy Labs				
0-999	25.0	72.5	100.0	5.52
1,000-2,499	27.0	75.0	100.0	4.94
2,500 & Over	29.0	80.0	100.0	4.31
Other Class Laboratories				
0-999	25.0	72.5	45.0	2.48
1,000-2,499	27.0	75.0	45.0	2.22
2,500 & Over	29.0	80.0	45.0	1.94
Comprehensive Colleges, Liberal Arts Colleges and Specialized Institutions				
Heavy Labs				
1,000-2,499	23.0	72.5	100.0	6.00
2,500 & Over	25.0	70.0	100.0	5.71
Other Class Labs				
1,000-2,499	23.0	72.5	50.0	3.00
2,500 & Over	25.0	70.0	50.0	2.86
Doctoral Granting Institutions				
Heavy Labs	23.0	70.0	100.0	6.21
Other Class Labs	23.0	70.0	50.0	3.11
Washington				
Community Colleges				
Science	27.0	80.0	60.0	2.78
Art and Music	27.0	80.0	60.0	2.78
Skill Labs	NA	NA	60.0	NA
Wisconsin	24.0	80.0	71.5	3.72
Ontario	18.0	75.0	See Ex. 5.1.15	a

a. Varies by discipline, level, institutional size, or other factor.

EXHIBIT 5.1.2 Student Station Sizes (ASF) by Discipline and Level for Teaching Labs California Community Colleges

Discipline	ASF[a]
Agriculture	115
Air Conditioning	130
Architecture	60
Auto-Body & Fender	200
Auto-Mechanic	200
Auto-Technology	75
Aviation Maintenance	175
Biological Sciences	55
Business and Management	30
Carpentry	175
Commercial Services	50
Communications	50
Computer & Information Science	40
Diesel	200
Dry-Wall	175
Education	75
Electricity	175
Engineering	75
Fine & Applied Arts	60
Foreign Language	35
Glazing	175
Graphic Arts	80
Health Services	50
Heavy Equipment	200
Home Economics	60
Interdisciplinary	60
Letters	35
Library Science	35
Machine Tools	90
Masonry	175
Mathematics	35
Metal Trades	90
Millwork	90
Painting	175
Physical Sciences	60
Plastering	175
Plastics	130
Plumbing	175
Psychology	35
Public Affairs & Service	50
Refrigeration	130
Roofing	175
Small Engine Repair	100
Social Sciences	35
Stationary Engine	200
Welding	90

a. Includes support space.

EXHIBIT 5.1.3 Student Station Size (ASF) by Discipline and Level for Teaching Labs, California State University

Discipline Category	Student Station Size (ASF)[a]	
	Lower	Upper
Agriculture	60.0	60.0
Anthropology	42.5	45.0
Architecture	68.0	82.7
Area Studies	30.0	30.0
Art	65.0	65.0
Biological Science	55.0	60.0
Broadcast Communication Arts	30.0	60.0
Business Admin. & Economics	30.0	30.0
Communications	30.0	30.0
Computer Science	49.0	49.0
Education	--	40.0
Engineering, Other	90.0	110.0
Fine Arts	60.0	80.0
Foreign Languages	40.0	40.0
Geography	42.5	45.0
Health Professions	40.0	50.0
Health Science	---	50.5
Home Economics	60.0	60.0
Humanities, General	40.0	40.0
Industrial Arts	68.0	82.7
Journalism	60.0	60.0
Mathematics	30.0	30.0
Physical Education	40.0	50.0
Physical Science	60.0	70.0
Psychology	40.0	60.0
Public Administration	30.0	30.0
Social Sciences, General	30.0	30.0

a. Excludes support space.

EXHIBIT 5.1.4 Student Station Size (ASF) by Discipline and Level for Teaching Labs, University of California

Discipline Category	Student Station Size (ASF)[a] Lower	Student Station Size (ASF)[a] Upper
Administration	33	33
Agricultural Biological Science	58	60
Agricultural Economics	33	33
Agricultural Science	60	60
Anthropology	43	45
Architecture	40	65
Arts, Performing	65	65
Arts, Visual	65	65
Biological Sciences	55	60
Computer Science	45	55
Education	40	40
Engineering Sciences	90	110
Engineering, Agricultural	90	110
Engineering, Chemical	75	90
Foreign Languages	40	40
Geography	45	50
International Relations	40	40
Journalism	40	40
Law	40	40
Letters	40	40
Library Sciences	40	40
Mathematical Science	30	30
Physical Science	60	70
Psychology	43	45
Social Ecology	45	45
Social Sciences, General	30	30
Social Welfare	30	30
Studies, Applied Behavior	40	40
Studies, Creative	40	40
Studies, Environmental	55	60
Studies, Interdisciplinary	30	30

a. Excludes support space.

EXHIBIT 5.1.5 Student Station Sizes (ASF) by

Discipline	ASF[a]
Agricultural Sciences	
Agronomy	
Soils	51.2
Soil Chemistry, Physical Microbiology	57.6
Field Crops, Weed Control	57.6
Animal Husbandry	
Chemical Analysis	49.6
Feeding and Care, Meat Technology	99.2
Breeding, Physiology, Nutrition	62.0
Dairy Husbandry	
Chemical Analysis	52.0
Feeding and Care, Milking Methods	104.0
Breeding, Physiology, Nutrition	65.0
Forestry and Range Management	
All Labs	45.5
Horticulture	
General, Lawn Management	75.0
Flowers Arrangement, Taxonomy	125.0
Germination and Propagation	250.0
Poultry Husbandry	
Genetics	130.0
Nutrition, Physiology	58.5
Arts and Crafts	
Architecture	
Elementary Design, Projections	42.7
Drawing and Rendering	42.7
Furniture Design, Interiors	48.8
Advanced Design, Landscape	61.0
Commercial Arts	
Introductory Advertising Design	41.7
Advanced Advertising Design	53.6
Fine Arts	
Jewelry and Metalsmith, Drawing, Design	42.4
Figure Drawing, Painting, Photography, Cinematography	54.4
Sculpture, Ceramics, Pottery, Crafts, Three-dimensional Applied Design, Printmaking	60.5
Individual Studios	90.8
Graphics, Drafting	
Engineering Drawing	34.8
Introductory Drafting, Design	40.6
Advanced Drafting, Graphics	46.4
Music	
Instrumental and Choral Groups	18.8
Piano Laboratories	56.2
Biological Sciences	
Anatomy and Histology	
Histology, Developmental Anatomy	43.4
Microscopic Anatomy, Vertebrate Morphology	55.3

a. Includes support space.

(continued)

Discipline and Level for Teaching Labs, Colorado

Discipline	ASF[a]
Gross Anatomy	74.4
All Graduate Laboratories	74.4
Bacteriology	
All Undergraduate Laboratories	59.4
All Graduate Laboratories	79.2
Biochemistry	
All Undergraduate	62.0
All Graduate	74.4
Biological Science	
General, Introductory	43.4
Biophysics	
All Undergraduate	55.8
All Graduate	74.4
Botany	
Elementary, Plant Anatomy, Taxonomy	43.8
Morphology, Mycology	56.2
Microtechnique, Plant Physiology	56.2
Pathology	75.0
All Graduate	75.0
Entomology	
Elementary, Introductory	43.4
All Other Undergraduate	55.8
All Graduate	74.4
Genetics	
Elementary	45.5
All Other Undergraduate	55.8
All Graduate	74.4
Microbiology	
All Undergraduate	55.8
All Graduate	74.4
Pathology	
All Undergraduate	55.8
All Graduate	74.4
Physiology	
Pharmacology, Chemical Physiology	55.8
Experimental, Animal Physiology	124.0
Plant Pathology	
Elementary, General	45.5
All Others Undergraduate	55.8
All Graduate	74.4
Zoology	
Introductory, Elementary, Comparative Anatomy, Physiology	42.0
Vertebrate, Invertebrate, Cytology, Embryology, Enzymology, Parasitology, Histology, Morphology, Ornithology, Ecology, Limnology, Taxonomy	54.0
Business	
Accounting: General Accounting	25.0
Management: Time and Motion Analysis	46.0
Secretarial	
Typewriter, Calculator	28.0
Combined Typing and Shorthand	33.6

Discipline	ASF[a]
Statistics	
Elementary	27.3
Intermediate, Advanced	32.7
Engineering Sciences	
Aeronautical: All Laboratories	177.0
Agricultural	
Electricity	53.1
Soil and Water	70.8
Structures	100.3
Farm Metal Work, Shop Work	135.7
Farm Machinery, Equipment	236.0
Chemical	
Instrumentation	35.4
Physical Chemistry	70.8
Unit Operations	177.0
Civil	
Photogrammetry, Surveying	59.0
Soils	70.8
Hydraulics, Concrete	103.8
Strength of Materials	177.0
Electrical	
Measurements, Control systems	53.1
Electronics	53.1
Circuits	88.5
Machines, Power Engineering	147.5
Geophysical	
Electricity, Magnetism	53.1
Circuitry, Electronics	53.1
Seismology	59.0
Prospecting, Well Logging	118.0
Industrial: Processes, Time and Motion	76.7
Mechanical	
Machine Shop, Machines	59.0
Mechanical, Thermodynamics	236.0
Manufacturing Processes	236.0
Metallurgical	
Microscopy	47.2
Physical Metallurgy	82.6
Spectrography	141.6
Mining: Unit Operations, Production	147.5
Petroleum	
Refining Processes	118.0
Unit Operations, Production	177.0
Home Economics	
Clothing and Textiles	
Materials	29.3
Textile Chemistry	46.8
Pattern Making, Sewing	52.7
Design, Costuming	52.7
General Home Economics	
All Lower Division	50.8
All Upper Division	63.5

(continued)

EXHIBIT 5.1.5, continued

Discipline	ASF[a]
Family and Child Development	
All Lower Division	51.2
All Upper Division	64.0
Food and Nutrition	
Taste Panel	31.3
Elementary Nutrition, Food Chemistry	50.0
Advanced Nutrition	62.5
Food Preparation and Analysis	75.0
Physical Sciences	
Astrogeophysics	
All Lower Division	49.6
All Upper Division	55.8
All Graduate	74.4
Astronomy	
All Lower	31.0
All Upper	62.0
All Graduate	74.4
Astrophysics	
All Undergraduate	62.0
All Graduate	74.4
Atmospheric Science	
All Lower	49.6
All Upper	62.0
All Graduate	74.4
Chemistry	
General, Elementary	50.0
Beginning Quantitative and Qualitative	56.2
Beginning Organic	56.2
Advanced Quantitative and Qualitative	62.5
Advanced Organic, Biochemistry	62.5
Physical Chemistry	75.0
All Graduate	75.0
Engineering Physics	
All Lower Division	49.6
All Upper Division	55.8
All Graduate	74.4
Geology	
Elementary, General	49.2
Crystallography, Mineralogy, Paleontology	49.2
Stratigraphy, Petrology, Petrography	61.5
Mapping, Cartography, Lithology	61.5
All Graduate Laboratories	73.8
General Physical Science	
General Subjects	43.4
Meteorology	
All Lower	49.6
All Upper	62.0
All Graduate	74.4
Physics	
General, Elementary	50.0
Intermediate, Electronics, Heat	56.2
Mechanics, Optics	56.2
Atomic Physics	75.0
Social Sciences	
Anthropology-Archaeology	
Linguistics	29.5
Archaeological Specimens	41.3
Elementary Physical Anthropology	41.3
Advanced Physical Anthropology	53.1
Geography	
Physical Geography	40.3
Cartography	57.5
Library Science	
Library Methods	59.0
Psychology	
Elementary Experimental	47.6
Advanced Experimental	53.6
Learning, Perception	53.6
Physiological Psychology	59.5
Testing	89.3
All Graduate	71.4
Sociology	
Observation Booth	15.2
Interview and Testing Booth	95.3
Mathematical Sciences	
Computer Science	
Programming	23.8
Keypunch	29.8
Remote Terminal (Teletype or Typewriter)	29.8
Remote Terminal (Complex)	71.4
Statistics	
Elementary	27.3
Intermediate, Advanced	32.7
Occupational Studies	
Beauty Care	
Barbering	72.0
Cosmetology	108.0
Health Care	
Dental Assistant	62.0
Dental Technology	62.0
Nursing Demonstration Ward	124.0
Police Science	
Crime Research	48.0
Mock Courtroom	30.0

a. Includes support space.

EXHIBIT 5.1.6 Student Station Size (ASF) by Discipline and Level for Teaching Labs, Florida Community Colleges

Discipline Category	Lower[a]
Academic	55
Occupational	94

a. Includes support space.

EXHIBIT 5.1.7 Student Station Size (ASF) by Discipline and Level for Teaching Labs, Florida Universities

Discipline Category	Lower[a]	Upper and Graduate[a]
Agriculture	60	80
Architecture	55	70
Area Studies	30	30
Biological Sciences	55	80
Business	25	25
Communications	35	55
Computer Sciences	35	35
Education	45	45
Engineering	55	125
Fine Arts	55	85
Foreign Languages	25	25
Health Professions	50	75
Home Economics	45	75
Law	25	25
Letters	25	25
Library Science	25	25
Mathematics	25	25
Physical Sciences	55	75
Psychology	50	70
Public Affairs	25	25
Social Sciences	35	40

a. Includes support space.

EXHIBIT 5.1.8 Student Station Size (ASF) by Discipline and Level for Teaching Labs, Kansas

	Student Station Size (ASF)[a]	
Discipline Category	Lower	Upper and Graduate
General Academic Instruction (Guideline applies to all program categories.)	---	---
Agriculture and Natural Resources	54.4	54.4
Architecture and Environmental Design	75.2	150.4
Area Studies	25.6	25.6
Biological Sciences	49.6	152.0
Business and Management	25.6	25.6
Communications	33.6	100.8
Computer and Information Sciences	25.6	25.6
Education	33.6	33.6
Physical Education	---	100.8
Industrial Education	166.4	166.4
Engineering	57.6	166.4
Fine and Applied Arts	75.2	150.4
Foreign Languages	40.0	40.0
Health Professions	72.0	72.0
Speech Pathology & Audiology	49.6	150.4
Home Economics	49.6	150.4
Law	62.4	62.4
Letters	25.6	25.6
Speech	100.8	100.8
Remedial Reading & Writing	40.0	40.0
Library Science	40.0	40.0
Mathematics	25.6	25.6
Military Science	25.6	25.6
Physical Sciences	49.6	150.4
Psychology	49.6	150.4
Public Affairs & Services, "Lab"	25.6	150.4
Public Affairs & Services, "Non-Lab"	49.6	49.6
Social Sciences, "Lab" (Anthropology, Archeology, Geography)	49.6	150.4
Social Sciences, "Non-Lab" (History, Economics, Sociology, etc.)	25.6	25.6
Theology	---	---
Interdisciplinary Studies	---	---
Business and Commerce Technologies	25.6	25.6
Data Processing Technologies	25.6	25.6
Data Processing Technologies	54.4	54.4
Mechanical & Engineering Technologies	115.5	115.5
Natural Science Technologies	54.4	54.4
Public Service Related Technologies	25.6	25.6

[a]Includes support space.

EXHIBIT 5.1.9 Student Station Size (ASF) by Discipline and Level for Teaching Labs, Nebraska

Discipline Category	All Levels[a]
Agriculture	
General Agriculture	0
Agriculture Biostatistics	15
Agriculture Biochemistry	55
Agricultural Communications	15
Agricultural Economics	15
Agricultural Education	40
Agricultural Engineering	80
Agronomy	55
Animal Science	80
Entomology	40
Food Science and Technology	70
Forestry, Fisheries and Wildlife	40
Horticulture	55
Plant Pathology	55
Veterinary Science	70
Architecture	70
Arts and Sciences	
Actuarial Science	15
African-Black Studies	15
Anthropology	30
Art	
Drawing, Painting	90
Sculpture, Ceramics, Pottery	90
Art History	16
Biology	25
Chemistry	
General	54
Biochemistry	55
Classics	15
Computer Science	60
Dramatic Arts	90
English	15
Environmental Health	15
Geography	40
Geology	40
History	15
International Studies	30
Life Sciences	
Biochemistry	40
Cell Biology-Genetics	40
Ecology, Evolution & Behavior	55
Microbiology	60
Physiology	60
Plant and Animal Biology	50
Plant Pathology	55
Mathematics and Statistics	15
Modern Languages and Literature	15
Music	
Individual Practice	70
Group Practice	25
History and Appreciation	40
Philosophy	15
Physics and Astronomy	50
Political Science	36
Psychology	24
ROTC	40
Sociology	32
Speech Communications	15
Theatre Arts	90
Business	
Accounting	15
Economics	15
Finance	15
Management	15
Marketing	15
Engineering	
Chemical Engineering	60
Civil Engineering	100
Construction Management	125
Electrical Engineering	60
Engineering Mechanics	60
Industrial Engineering	70
Mechanical Engineering	100
Home Economics	
Education & Family Resources	25
Human Development & the Family	25
Human Nutrition & Food Service Management	70
Textiles, Clothing & Design	60
Interior Design	60
Journalism	40
Law	60
Public Affairs and Community Service	
Criminal Justice	35
Gerontology	15
Public Administration/Urban Studies	15
Social Work	15
Education	
Adult & Continuing Education	15
Speech Pathology & Audiology	55
Educational Administration	15
Educational Psychology & Social Foundation	35
Elementary Education	80
Curriculum & Instruction	0
Counseling & Special Education	0
Health, Physical Education & Recreation	150
Secondary Education	15
Technology	
Agricultural Business Technology	15
Agricultural Land & Water Technology	77
Agricultural Machinery Mechanics Technology	
Welding and Small Engines	55
Tractors	161
Painting and Cleaning	182
Commercial Horticulture Technology	66
Production Agriculture Technology	46
Veterinary Technology	37

[a] Excludes support space.

EXHIBIT 5.1.10 Student Station Sizes (ASF) by Discipline and Level for Teaching Labs, New Hampshire

Discipline	Upper and Lower	Graduate[a]
Agriculture	60	80
Architecture	75	110
Area Studies	30	30
Biological Sciences	55	110
Business	20	25
Communications	35	75
Computer Science	35	55
Education	35	35
Physical Education	35	50
Engineering	55	145
Fine and Applied Arts	75	110
Foreign Languages	40	25
Health Professions	75	75
Home Economics	45	95
Law	0	0
Letters	25	25
Library Science	25	40
Mathematics	25	25
Military Science	35	35
Physical Science	55	110
Psychology	50	95
Public Affairs	25	50
Social Sciences	35	50
Business/Commerce - TSAS	20	---
Math/Engineering - TSAS	40	---
Science/Tech - TSAS	55	---
Industrial Training	162	162

a Includes support space.

EXHIBIT 5.1.11 Student Station Sizes (ASF) by Discipline and Level for Teaching Labs, New Jersey

Discipline	All Levels[a]
Agriculture and Natural Resources	60
Architecture and Environmental Design	65
Biological Sciences	60
Business and Management	30
Communications	30
Radio/TV	75
Computer and Information Science	35
Education (except P.E.)	30
Industrial Arts Education	80
Engineering	100
Fine and Applied Arts	
Art	60
Music (Group rehearsal)	25
Dramatic Arts	100
Applied Design	60
Foreign Languages	30
Home Economics	60
Letters	30
Linguistics	30
Spee[illegible] Debate	30
Library Science	30
Mathematics	
Statistics	30
Physical Science	60
Psychology	45
Social Sciences	
Anthropology	40
Geography	30
Business and Commerce Technologies	30
Photography	50
Communications and Broadcasting	75
Printing and Lithography	60
Applied Graphics and Fine Arts (including Advertising Design)	60
Data Processing Technologies	40
Health Services and Paramedical Technologies	45
Mechanical and Engineering Technologies	110
Engineering Graphics	60
Architectural Drafting	60
Electronics	60
Natural Science Technologies	50
Public Service Technologies	30

a. Includes support space.

EXHIBIT 5.1.12 Student Station Size (ASF) by Discipline and Level for Teaching Labs, New York (CUNY)

Discipline	Undergraduate[a]	Graduate[a]
Visual Arts		
Drawing and Design	50.0	125
Metal Work	50.0	125
Jewelry	50.0	125
Painting	50.0	125
Sculpture	62.5	125
Ceramics	87.0	125
Photo	62.7	125
Performing Arts		
Theater		
Instrument Rehearsal	20.0	20
Piano	80.0	80
Choral	20.0	20
Speech and Languages		
Speech	30.0	30
Demonstration Lab	60.0	60
Language	30.0	30
Sciences		
General	70.0	70
Physical	60.0	60
Biological	60.0	60
Mathematics	42.0	42
Social Sciences		
Anthropology	45.0	60
Cartography	48.0	48
Geography	52.8	52.8
Psychology	57.5	82.5
Psychology Testing and Scoring	36.0	36
Statistics Measurement	20.0	20
Vocational-Technical		
Accounting/Bookkeeping	30.0	--
Bus. Mach. Lab	30.0	--
Management	30.0	--
Electronic Data Lab	30.0	--
Secretarial Prac. Lab	24.0	--
Typing Lab	24.0	--
Shorthand Lab	24.0	--
Student Shop	30.0	--
Machine Shop	--	--
Engineering Lab	50.0	--
Proj. Lab and Drafting	85.0	--
Gen'l. Industrial Lab	50.0	--
Diesel Engine Lab	120.0	--
Drafting Room	50.0	--
Electric Lab	60.0	--
Elec. Machinery Lab	100.0	--
Electric Power Lab	100.0	--
Electronics Lab	60.0	--
Heating and Air Conditioning Lab	120.0	--
Internal Combustion Lab	80.0	--
Machine Tool Lab	120.0	--
Masonry Lab	90.0	--
Materials Test Lab	80.0	--
Metallurgy-Structures Lab	80.0	--
Welding Lab	60.0	--
Automotive Service Trades		
Aerospace Service Aide	218.2	--
Air Frame Mechanics	218.2	--
Air Craft Poser Plant	218.2	--
Auto Eng. and Power Train	218.2	--
Auto Mechanics (Elementary)	218.2	--
Auto Mechanics (Advanced)	218.2	--
Automotive Body and Chassis	218.2	--
Auto Mechanics (Body)	218.2	--
Automotive Service	218.2	--
Auto Transmissions	145.5	--
Diesel Mechanics (Welding)	145.5	--
Heavy Equipment	218.2	--
Power Plant Mechanics	218.2	--
Small Engines	145.5	--
Industrial Trades		
Htg. & Refrig. Service	181.8	--
Industrial Machine Tools	145.5	--
Industrial Welding	109.1	--
Machinist (Tool and Die)	145.5	--
Refrigeration and Air Conditioning	181.8	--
Welding	109.1	--
Building Construction Trades		
Building Construction	181.8	--
Carpentry (Elementary)	181.8	--
Carpentry (Advanced)	181.8	--
Electrical Constuction and Mainten.	109.1	--
Electrical Services (Electricity)	109.1	--
Masonry	145.5	--
Plumbing, Heating, and Pipe Fitting	145.5	--
Wood Products	181.8	--
Building Interior Services	109.1	--

a. Includes support space.

(continued)

EXHIBIT 5.1.12, continued

Discipline	Undergraduate[a]	Graduate[a]
Graphic Arts		
A.V. Education Media	72.7	--
Commercial and Advertising Art	72.7	--
Drafting	72.7	--
Graphic Arts Cameraman	72.7	--
Graphic Arts and Printing	109.1	--
Offset Printing	109.1	--
General Repair Services		
Appliance Repair	109.1	--
Electronic Equipment Repair	109.1	--
Instrument Repairman	109.1	--
Library Aides and Book Binding	72.7	--
Machines and Vending	109.1	--
Business and Personal Services		
Data Processing	65.5	--
Beginning Office Worker	54.5	--
Clerical-Stenographic	54.5	--
Machine Clerical	54.5	--
Office Practice	54.5	--
Secretarial Practice	54.5	--
Commercial Driving	NA	
Commercial Hostess	54.5	--
Practical Nursing	90.9	--
Food Services		
Chef	109.1	--
Commercial Cooking	109.1	--
Food Services	109.1	--
Agriculture		
Agricultural Production	54.5	--
Dairy Cattle Management	54.5	--
Farm Mechanics	218.2	--
Greenhouse Management	54.5	--
Institutional Grounds Keeper	54.5	--
Pest Control (Exterminators)	54.5	--

a. Includes support space.

EXHIBIT 5.1.13 Student Station Sizes (ASF) by Discipline and Level for Teaching Labs, Ohio

Discipline	Lower[a]	Upper and Graduate[a]
Speech	50	50
Geography	65	65
Psychology	45	45
Anthropology	60	60
Biological Sciences	60	75
Chemistry	70	70
Physics	70	70
Geology	65	65
Other Physical Sciences	60	60
Mathematics	35	35
Animal and Dairy Science	120	120
All Other Agriculture	55	75
Allied Medical	65	65
Architecture	70	70
Art	70	70
Climatography and Photography	70	70
Computer Science	45	45
Engineering		
Architectural	70	70
General and Electrical	100	100
Agricultural, Chemical, Civil, Metal, Ceramic, Textile, and Environmental	120	120
Aeronautical, Petroleum, Geological, Materials, Mining, Nuclear, Naval Architectural, Oceanographic, and Engineering Technology	140	140
Mechanical, Industrial and Engineering Mechanics	150	150
Drama	200	200
Dance	150	150
Home Economics	60	60
Journalism	50	50
Library Science	50	50
Music	75	75
Nursing	55	55
All others	35	35

a. Includes support space.

EXHIBIT 5.1.14 Student Station Sizes (ASF) by Discipline and Level for Teaching Labs, Oklahoma

Discipline Category	Lower[a]	Upper and Graduate[a]
Academic		
Life Science	75	75
Mathematical, Computer, Physical and Engineering Sciences	144	144
Behavioral Sciences	60	60
Humanities	48	48
Professions	48	48
Technical-Vocational		
Agriculture		
Apparel	75	--
Graphic Arts	75	--
Health	75	--
Public Service	38	--
Business	38	--
Construction	96	--
Engineering and Industrial	96	--
Transportation	96	--

a. Includes support space.

EXHIBIT 5.1.15 Student Station Size (ASF) by Discipline and Level for Teaching Labs, Oregon

Discipline Category	All Levels[a]
Animal Science	160
Chemical Engineering	160
Electrical Engineering	110
Theater	100
Chemistry	68
Dairy Science	68
Geology	68
Physics	65
Plant Pathology	65
Anthropology	50
Zoology	50
Business Administration	32
Speech	32

a. Includes support space.

Note: Examples only; Oregon does not have a complete discipline schedule.

EXHIBIT 5.1.16 Student Station Sizes (ASF) by Discipline and Level for Teaching Labs, Ontario

Discipline Category	All Levels[a]
Engineering, Metallurgy, and Agriculture (except Agricultural Economics)	116
Physical and Biological Sciences	87
Education, Anthropology, Geography, Psychology, Physical Education, Environmental Studies, and Related Fields	73
All Other Fields	43

a. Includes support space.

5.4 Normalized Teaching Laboratory Standards in the Surveyed States

Exhibits 5.2, 5.3 and 5.4 present the normalized teaching laboratory space factors for each state using the profile of each prototype system.

Information for California is presented in bold type at the bottom of each exhibit. Mean and median averages have been calculated for all states' factors excluding California. This information is found just above the results for California on each page. Finally, we have listed the ranking for California to show where the State's normalized space factor falls in relation to other states. The state whose normalized space factor would generate the most ASF would be ranked 1/11, for example, while the state whose normalized space factor would generate the least ASF would be ranked 11/11.

5.5 Summary of Findings: Teaching Laboratory Standards/Guidelines

Teaching laboratory space needs are estimated using a similar formula to that used for classrooms. Assumptions are established by each state regarding the room availability, room use, station size and station occupancy. However, the assumed hours of room use are lower for teaching laboratories than classrooms. The primary reasons for this assumption for laboratory standards are:

EXHIBIT 5.2 Comparison of ASF/WSCH for Class Laboratories Among the Surveyed States

Prototype System: *Community College*
Student Level: *Lower Division*

	ASF/WSCH				
		Increase (Decrease) Due To:			
State	Base Factor[a]	Enrollment Counting Period[b]	Daytime vs. Evening Enrollments[b]	Normalized Factor	Rank
Colorado	2.70		(1.08)	1.62	
Florida	3.18	(.42)		2.76	
Kansas	N/A				
Maryland	3.29	.23	(1.32)	2.20	
Nebraska	N/A				
New Hampshire	N/A				
New Jersey	2.41			2.41	
Ohio	N/A				
Oklahoma	N/A				
Ontario, Canada	N/A				
Oregon	N/A				
Tennessee	3.13	.22	(1.26)	2.09	
Utah	3.39	.24		3.63	
Virginia	2.37			2.37	
Washington	N/A				
Wisconsin	3.72	.26		3.98	
Mean (Excluding California)				2.63	
Median (Excluding California)				2.41	
California	2.86			2.86	3/9

a. The weighted average ASF/WSCH taken from the appropriate exhibits in Volume II.

b. Derived by applying the appropriate percentage adjustment from Appendix A.

- in many labs, time is required for set-up and take-down of experiments, limiting the hours available for scheduling;
- most labs are special purpose and limited to use for only a few courses with limited enrollments; and
- time is needed for unscheduled use by students to continue work on projects or experiments, particularly at the upper division.

All states assume a higher station occupancy rate for teaching laboratories than classrooms. This is due to the fact that lab space typically has fewer stations, are often connected with larger lecture sections, and spaces can usually be scheduled more optimally than in general classrooms.

Student station size assumptions vary widely among the states due to differences in needs among disciplines and due to the differences in teaching practices of the institutions. Most states apply dif-

EXHIBIT 5.3.1 Comparison of ASF/WSCH *for Class Laboratories Among the Surveyed States*

Prototype System: *State University System*
Student Level: *Lower Division*

	ASF/WSCH				
		Increase (Decrease) Due To:			
State	Base Factor[a]	Enrollment Counting Period[b]	Daytime vs. Evening Enrollments[b]	Normalized Factor	
Colorado	2.35		(.35)	2.00	
Florida	2.00	(.24)		1.76	
Kansas	2.49	.05		2.54	
Maryland	4.36	.08	(.65)	3.79	
Nebraska	3.85	.07		3.92	
New Hampshire	2.35	.04		2.39	
New Jersey	2.18			2.18	
Ohio	2.71	.05	(.41)	2.35	
Oklahoma	1.83	2.47		4.30	
Ontario, Canada	4.63		(.69)	3.94	
Oregon	N/A				
Tennessee	3.13	.06	(.47)	2.72	
Utah	3.39	.06		3.45	
Virginia	3.56			3.56	
Wisconsin	3.72	.06		3.78	
Mean (Excluding California)				3.05	
Median (Excluding California)				2.72	
					Rank
California	2.00			2.00	14/15

a. The weighted average ASF/WSCH taken from the appropriate exhibits in Volume II.

b. Derived by applying the appropriate percentage adjustment from Appendix A.

ferent station sizes to the disciplines included in their taxonomy of programs. The number of different station size categories used by states range from 2 to more than 60. In some states, student station size assumptions also vary by type of institution (four states) or level of instruction (five states). In California, station size criteria vary both by type of institution and level of instruction. In states which recognize variations between lower and upper division, student station size increases with the level of instruction, due to smaller class size and more elaborate equipment and instrumentation.

California's class lab standards for community colleges produce a somewhat larger amount of square feet per weekly contact hour than most of the survey states, even though California's utilization requirements are higher than the other states. The differential appears to be associated, in part, with California's relatively heavy emphasis on occupational programs. California standards give specific

EXHIBIT 5.3.2 Comparison of ASF/WSCH for Class Laboratories Among the Surveyed States

Prototype System: *State University System*
Student Level: *Upper Division*

	ASF/WSCH				
		Increase (Decrease) Due To:			
State	Base Factor[a]	Enrollment Counting Period[b]	Daytime vs. Evening Enrollments[b]	Normalized Factor	Rank
Colorado	2.35		(.35)	2.00	
Florida	3.09	(.37)		2.72	
Kansas	4.42	.08		4.50	
Maryland	4.36	.08	(.65)	3.79	
Nebraska	3.85	.07		3.92	
New Hampshire	4.78	.09		4.87	
New Jersey	2.18			2.18	
Ohio	2.71	.05	(.41)	2.35	
Oklahoma	1.83	2.47		4.30	
Ontario, Canada	4.63		(.69)	3.94	
Oregon	N/A				
Tennessee	4.17	.08	(.63)	3.62	
Utah	3.39	.06		3.45	
Virginia	3.56			3.56	
Wisconsin	3.72	.06		3.78	
Mean (Excluding CA)				3.50	
Median (Excluding CA)				3.62	
California	2.94			2.94	11/15

a. The weighted average ASF/WSCH taken from the appropriate exhibits in Volume II.

b. Derived by applying the appropriate percentage adjustment from Appendix A.

recognition to the large space requirements of Auto Mechanics, Diesel and Heavy Equipment (200 ASF per station) while most other states use a composite allowance based on their own assumptions of the relative weighting among disciplines. Florida, for example, bases its composite measure on studies of its own discipline distribution. If Florida used the distribution in the prototype system, its composite figure would likely be larger. In addition, the high proportion of evening enrollments in the prototype system (40 percent), which reflects the experience of the California Community Colleges, significantly reduces the normalized allowances for two states, Maryland and Tennessee, who have larger unadjusted allocations but who do not count evening enrollments.

In the state university and research university comparisons, California's space allowance factors for teaching laboratories generated fewer square feet per student (or contact hour) than most states. As in the case of the classroom standards/guidelines,

EXHIBIT 5.3.3 Comparison of ASF/WSCH for Class Laboratories Among the Surveyed States

Prototype System: *State University System*
Student Level: *Graduate*

	ASF/WSCH				
		Increase (Decrease) Due To:			
State	Base Factor[a]	Enrollment Counting Period[b]	Daytime vs. Evening Enrollments[b]	Normalized Factor	Rank
Colorado	2.35		(.47)	1.88	
Florida	2.41	(.24)		2.17	
Kansas	4.42	.09		4.51	
Maryland	4.36	.08	(.87)	3.57	
Nebraska	3.85	.07		3.92	
New Hampshire	4.78	.09		4.87	
New Jersey	2.19			2.19	
Ohio	2.71	.05	(.54)	2.22	
Oklahoma	1.83	2.57		4.40	
Ontario, Canada	N/A				
Oregon	N/A				
Tennessee	4.17	.08	(.83)	3.42	
Utah	3.39	.07		3.46	
Virginia	3.56			3.56	
Wisconsin	3.72	.08		3.80	
Mean (Excluding California)			3.38		
Median (Excluding California)			3.50		
California	2.93			2.93	10/14

a. The weighted average ASF/WSCH taken from the appropriate exhibits in Volume II.

b. Derived by applying the appropriate percentage adjustment from Appendix A.

California's space utilization requirements are more stringent than other states. California requires that teaching labs be used 27.5 hours per week for lower division enrollments and 22 hours per week for upper division enrollments. The requirements in other states fall more in the range of 22-24 hours per week for the lower level and 18-20 hours for the upper level. California's upper division lab station occupancy expectation of 80 percent, appears in line with other states. However, the 85 percent expectation for lower division station occupancy is the highest among comparison states.

An additional factor to keep in mind is that the standards applicable to the University of California do not generate a separate allowance for graduate student teaching lab space. The University's standards are based upon the assumption that teaching lab needs at the graduate level will be met by the allowances for research laboratories. The standards in all of the other states generate specific teaching

EXHIBIT 5.4.1 Comparison of ASF/FTE for Class Laboratories Among the Surveyed States

Prototype System: *Research University System*
Student Level: *Lower Division*

	ASF/FTE				
		Increase (Decrease) Due To:			
State	Base Factor[a]	Enrollment Counting Period[b]	Daytime vs. Evening Enrollments[b]	Normalized Factor	
Colorado	19.41		(1.94)	17.47	
Florida	15.23	(1.93)		13.36	
Kansas	18.95	.59		19.54	
Maryland	24.35	.75	(2.44)	22.66	
Nebraska	31.56	.97		32.53	
New Hampshire	18.71	.58		19.29	
New Jersey	19.20			19.20	
Ohio	25.41	.78	(2.54)	23.65	
Oklahoma	13.50	17.99		31.49	
Ontario, Canada	34.98		(3.50)	31.48	
Oregon	N/A				
Tennessee	17.46	.54	(1.75)	16.25	
Utah	18.91	.59		19.50	
Virginia	26.02			26.02	
Wisconsin	20.80	.64		21.44	
Mean (Excluding California)			22.42		
Median (Excluding California)			19.54		
					Rank
California	15.41			15.41	14/15

a. The weighted average ASF/FTE taken from the appropriate exhibits in Volume II.

b. Derived by applying the appropriate percentage adjustment from Appendix A.

lab space for graduate students. Using the mean of 14.59 ASF/FTE (Exhibit 5.4.3) used by other states for graduate level teaching labs, it can be estimated that California must accommodate 374,613 ASF of equivalent teaching lab space within its research lab allowance. In recognition of this difference, we have deducted these ASF from California's total research space allocation presented in Exhibit 6.26 to reflect an allowance for teaching lab space.

EXHIBIT 5.4.2 Comparison of ASF/FTE for Class Laboratories Among the Surveyed States

Prototype System: *Research University System*
Student Level: *Upper Division*

	ASF/FTE				
		Increase (Decrease) Due To:			
State	Base Factor[a]	Enrollment Counting Period[b]	Daytime vs. Evening Enrollments[b]	Normalized Factor	
Colorado	18.90		(2.84)	16.06	
Florida	26.43	(3.34)		23.09	
Kansas	44.09	1.36		45.45	
Maryland	23.79	.73	(3.57)	21.16	
Nebraska	31.41	.97		32.38	
New Hampshire	42.33	1.31		43.64	
New Jersey	18.67			18.67	
Ohio	25.65	.79	(3.85)	22.59	
Oklahoma	11.29	15.04		26.33	
Ontario, Canada	34.63		(5.19)	29.44	
Oregon	N/A				
Tennessee	22.73	.70	(3.41)	20.02	
Utah	18.47	.57		19.04	
Virginia	26.99			26.99	
Wisconsin	20.32	.63		20.95	
Mean (Excluding California)				26.13	
Median (Excluding California)				22.59	
					Rank
California	21.35			21.35	11/15

a. The weighted average ASF/FTE taken from the appropriate exhibits in Volume II.

b. Derived by applying the appropriate percentage adjustment from Appendix A.

EXHIBIT 5.4.3 *Comparison of ASF/FTE for Class Laboratories Among the Surveyed States*

Prototype System: *Research University System*
Student Level: *Graduate 1*

	ASF/FTE				
		Increase (Decrease) Due To:			
State	Base Factor[a]	Enrollment Counting Period[b]	Daytime vs. Evening Enrollments[b]	Normalized Factor	
Colorado	10.22		(1.02)	9.20	
Florida	13.84	(.95)		12.89	
Kansas	22.90	.71		23.61	
Maryland	13.66	.42	(1.37)	12.71	
Nebraska	17.82	.55		18.37	
New Hampshire	21.92	.68		22.60	
New Jersey	10.19			10.19	
Ohio	13.84	.43	(1.38)	12.89	
Oklahoma	7.21	10.71		17.92	
Ontario, Canada	N/A				
Oregon	N/A				
Tennessee	13.06	.40	(1.31)	12.15	
Utah	10.61	.33		10.94	
Virginia	14.18			14.18	
Wisconsin	11.67	.36		12.03	
Mean (Excluding California)				14.59	
Median (Excluding California)				12.89	
					Rank
California	N/A				N/A

a. The weighted average ASF/FTE taken from the appropriate exhibits in Volume II.

b. Derived by applying the appropriate percentage adjustment from Appendix A.

6

Standards/Guidelines for Research Laboratories

Most higher education space planners agree that research laboratories are the most difficult space category for which to develop commonly acceptable standards/guidelines. Yet, research laboratories are becoming some of the most important space in graduate/research universities as the role of academic research in state economic development continues to expand. Perhaps the creative nature of research itself is the reason that standards/guidelines have been so difficult to derive and implement for research laboratories. Whatever the reason, only 13 of the 19 states we visited had standards/guidelines for research labs. Those 13 states were:

California
Colorado
Florida
Kansas
Maryland
Nebraska
New Hampshire
Ohio
Ontario, Canada
Oregon
Utah
Virginia
Wisconsin

6.1 The Research Laboratory Formulas

Unlike the classroom and teaching lab space categories, there are no commonly accepted mathematical formulas or concepts among the states for research laboratories. Instead, each state has adopted mathematical concepts which fit its unique space needs and available data.

The basic mathematical concepts for calculating research lab needs of the twelve states are as follows (Note: even though the same algebraic letters may be used for the different states, they represent algebraic terms unique to that state.):

California: $[(F_i)(S_{fi})+(GS_i)(S_{gi})]x(1.0 + S_{si})=ASF_i$

Where:

F_i = All budgeted state funded FTE faculty in the ith discipline
S_{fi} = Space factor for faculty in the ith discipline (ASF/faculty)
GS_i = Number of headcount state funded graduate students in the ith discipline
S_{gi} = Space factor for graduate students in the ith discipline (ASF/student)
S_{si} = Space factor percentage for support space
ASF_i = Total assignable square feet of research lab space needed in the ith discipline

Colorado: $(F_i)(S_{fi}) + (G_i)(S_{gi}) = ASF_i$

Where:

F_i = Number of FTE faculty in the ith discipline
Sf_i = Space allowance per faculty in ith discipline
G_i = Number of FTE graduate students in ith discipline
S_{gi} = Space allowance for graduate students (headcount) in the ith discipline
ASF_i = Total assignable square feet of research lab space needed for the ith discipline

Florida: $(R_i)(S_{ri}) + (A_i)(S_{ai}) + (B_i)(S_{bi}) = ASF_i$

Where:

R_i = FTE research faculty only in the ith discipline
S_{ri} = Space factor for research faculty in the ith discipline
A_i = Number of FTE advanced graduate students in the ith discipline
S_{ai} = Space factors for advanced graduate students in the ith discipline
B_i = Number of FTE beginning graduate students in the ith discipline
S_{bi} = Space factor for beginning graduate students in the ith discipline
ASF_i = Total assignable square feet of research lab space needed in the ith discipline

Kansas: $(U_i)(S_{ui}) + (G_i)(S_{gi}) = ASF_i$

Where:

U_i = A research unit in the ith discipline consisting of one FTE faculty research position and 4 headcount graduate students
S_{ui} = Space factor (ASF/Unit) for a research unit in the ith discipline
G_i = Number of headcount graduate students involved in research, above 4 per faculty research position, in the ith discipline
S_{gi} = Space factor (ASF/student) for countable graduate students

ASF_i = Total assignable square feet of research space needed in the i^{th} discipline

Maryland: $(F_i)(S_{fi}) + (F_i')(.5S_{fi}) + (D_i)(S_{di}) + (M_i)(.5S_{di}) = ASF_i$

Where

F_i = Number of full-time faculty in i^{th} discipline offering doctoral degree (zero if doctorate not offered)

S_{fi} = Space factor for faculty in the i^{th} discipline

F_i' = Number of full-time faculty in the i^{th} discipline where highest degree is master (zero if doctorate offered)

D_i = Number of full-time doctoral or post-doctoral students in the i^{th} discipline

S_{di} = Space factor for doctoral/post-doctoral students in the i^{th} discipline

M_i = Number of masters students in i^{th} discipline

ASF_i = Total assignable square feet of research lab space needed in the i^{th} discipline

Nebraska: $(AHC_{fi} + AHC_{gi} + AHC_{pi})(S_i) = ASF_i$

Where:

AHC_{fi} = Adjusted headcount (full-time = all full-time plus all part-time, 1/2 time or greater, plus FTE for all part-time less than 1/2 time) faculty in i^{th} discipline

AHC_{gi} = Adjusted headcount graduate students in the i^{th} discipline

AHC_{pi} = Adjusted headcount postdoctoral students in i^{th} discipline

S_i = Space factor for research lab (ASF/unit) in i^{th} discipline

ASF_i = Total assignable square feet of research lab space in i^{th} discipline

New Hampshire: $(R_i)S_{ri} + (Gi)(Sgi) = ASF_i$

Where:

R_i = FTE research faculty only in the i^{th} discipline

S_{ri} = Space allowance (ASF) per FTE research faculty in the i^{th} discipline

G_i = FTE graduate students in the i^{th} discipline

Sgi = Space allowance (ASF) per FTE graduate student for research labs in the i^{th} discipline

ASF_i = Total assignable square feet of research lab space in the i^{th} discipline

Ohio: $[(P_{mi})(MHC_i) + (P_{ji})(DHC_i) + (P_{fi})(FHC_i)](S_i) = ASF_i$

Where:

P_{mi} = Percent of masters headcount requiring research lab space at a given time in i^{th} discipline

MHC_i = Masters headcount in i^{th} discipline

P_{ji} = Percent of doctoral student headcount requiring research lab space at a given time in i^{th} discipline

DHC_i = Doctoral headcount in i^{th} discipline

P_{fi} = Percent of faculty headcount in i^{th} discipline requiring research lab space at a given time

FHC_i = Faculty headcount in i^{th} disciplines

S_i = Space factor for research lab (ASF/Module) in the i^{th} discipline

ASF_i = Total assignable square feet of research lab space needed in the i^{th} discipline

Ontario: $(F_i + .5\ NF_i + .5\ G_i)(S_i) = ASF_i$

Where:

F_i = FTE faculty in i^{th} discipline

NF_i = Number of non-faculty researchers in i^{th} discipline

G_i = FTE graduate students in i^{th} discipline

S_i = Space allowance for research lab space per faculty in i^{th} discipline

ASF_i = Total assignable square feet of research lab space needed in the i^{th} discipline

Oregon: $(F_i + GA_i + .33\ DS_i)(S_i) = ASF_i$

Where:

F_i = FTE faculty in i^{th} discipline

GA_i = Number of graduate assistants in the i^{th} discipline

DS_i = Number of doctoral graduate students not counted above

S_i = Space allowance for research lab per faculty in i^{th} discipline

ASF_i = Total assignable square feet of research lab space needed in the i^{th} discipline

Utah: $(F_i)(S_i) = ASF_i$

Where:

F_i = All faculty in the i^{th} discipline

S_i = Space factor per faculty in i^{th} discipline

ASF_i = Total assignable square feet of research lab space needed in the i^{th} discipline

Virginia: $(F_i + GA_i)(S) + (FRU_i)(Su_i) + (G_i)(S_{gi}) = ASF_i$

Where:

F_i = Number of FTE faculty in i^{th} discipline

GA_i = Number of FTE graduate assistants in the i^{th} discipline

S_i = Space allowance for research office (beyond normal office) for faculty and graduate assistants in the i^{th} discipline

FRU_i = Number of faculty research units (one FTE faculty plus four FTE graduate students) in i^{th} discipline

S_{ui} = Space allowance per FRU in the i^{th} discipline

G_i = Number of FTE graduate students beyond those included in faculty research unit count

S_{gi} = Space allowance for additional graduate students in i^{th} discipline

ASF_i = Total assignable square feet of research lab space needed in the i^{th} discipline

Wisconsin: $(3TF_i + 15RF_i + 3RA_i + 12DHC_i + 15PD_i)(S_i) = ASF_i$

Where:

TF_i = FTE teaching faculty above rank of instructor in i^{th} discipline

RF_i = FTE research faculty in i^{th} discipline

RA_i = Headcount degree candidates conducting research in the i^{th} discipline

DHC_i = Doctoral headcount degree candidates in the i^{th} discipline

PD_i = Number of FTE postdoctoral students in the i^{th} discipline

S_i = Space allowance for research labs for i^{th} discipline

ASF_i = Total assignable square feet of research lab space needed in the i^{th} discipline

6.2 Unadjusted Research Laboratory Standards/Guidelines of the States

Exhibits 6.1 through 6.13 show the unadjusted research laboratory standards/guidelines of the 13 states in the form in which the state has designed the standards.

6.3 Research Laboratory Space for Contract and Grant Programs

All of the states with research lab standards/guidelines, except California, recognize a need for research lab space for contracts and grant programs.

6.4 Normalization of Research Laboratory Standards/Guidelines

The method chosen to normalize the research laboratory standards/ guidelines was as follows:

Step 1: Crosswalk the standards/guidelines of each state into California's discipline categories, while maintaining each state's base units (e.g., ASF/FTE faculty, or ASF/graduate student, etc.). See Exhibits 6.14 through 6.24.

Step 2: Calculate a weighted average standard-/guideline (e.g., ASF/FTE faculty) for the whole university system based on prototype distribution of enrollments and research staff (Exhibits 6.14 through 6.24).

Step 3: Assume other characteristics of the prototype research university system as shown in Exhibit 6.25. It should be noted that the prototype assumptions in Exhibit 6.25 have been expanded into two sets of system characteristics expressed in different assumptions about the systems' operating budget policies. The differentiation according to budget policies was necessitated by the fact that some state systems, including California, tend to pay all faculty, including those doing contract and grant work, from state funds while other systems pay most faculty working on contracts and grants from a contract and grant budget. In addition, some systems budget state funded research faculty separately, while others, including California, do not separately budget state funded research. To handle the above differences, we defined the prototype data in Exhibit 6.25 as follows:

Budget Policy A:

- Most faculty are paid from state funds even though working on grants and contract research;
- Research faculty efforts are not budgeted separately; and
- Teaching faculty efforts are not budgeted by program level (e.g., lower, upper, etc.).

Budget Policy B:

- Faculty working on contracts and grants are paid from the contract and grants budget, and
- Research faculty are budgeted separately.

It should also be noted in Exhibit 6.25, that while Budget Policies A and B differ, the total number of faculty and students are the same under both policies. States using Budget Policy A include California, Colorado, Maryland, Nebraska, Ontario, Oregon, Utah and Virginia. States using Budget Policy B include Florida, Kansas, and New Hampshire.

EXHIBIT 6.1 Unadjusted Research Lab Standards/Guidelines, California

Discipline	ASF/FTE State Funded Faculty[a]	ASF Per State Funded Graduate Student[a]	California % Add-On for Service Space
Administration	53	20	6.7
Agricultural Biological Science	275	165	10.0
Agricultural Economics	53	—	6.7
Agricultural Science	300	185	10.0
Anthropology	145	80	7.5
Architecture and Environmental Design	100	130	10.0
Arts, Performing	100	125	10.0
Arts, Visual	100	125	10.0
Biological Sciences	250	145	10.0
Computer Science	180	100	10.0
Education	80	20	10.0
Engineering Sciences	300	185	15.0
Engineering, Agricultural	500	285	15.0
Engineering, Chemical	275	165	12.5
Foreign Languages	40	—	5.0
Geography	145	60	7.5
International Relations	80	20	10.0
Journalism	80	—	10.0
Law	80	25	10.0
Letters	40	—	5.0
Library Sciences	80	20	10.0
Mathematical Sciences	60	—	5.0
Physical Science	250	145	10.0
Psychology	145	80	7.5
Social Ecology	145	80	7.5
Social Sciences, General	40	—	5.0
Social Welfare	40	20	5.0
Speech	70	63	7.5
Studies, Applied Behavioral	125	35	10.0
Studies, Creative	---	---	---
Studies, Environmental	145	60	7.5
Studies, Interdisciplinary	40	—	5.0

a. Excludes support space.

Step 4: Apply each state's methodology utilizing the weighted average standards/guidelines from the crosswalk tables (Exhibits 6.14 through 6.24) to derive the total ASF for research lab space generated by each state's standards/guidelines.

6.5 Normalized Research Laboratory ASF Generated by Appling Surveyed States' Standards

Exhibit 6.26 shows the resulting normalized ASF for the prototype research university system.

EXHIBIT 6.2 Unadjusted Research Lab Standards/Guidelines, Colorado

Discipline Category	ASF/FTE Faculty[a]	ASF/FTE Grad Student[a]
Agricultural Sciences		
Agronomy	244	155
Animal Husbandry	266	178
Dairy Husbandry	244	155
Dairy Manufacturing	264	176
Farm Management	220	140
Horticulture	232	148
Ornamental Horticulture	232	148
Poultry Husbandry	366	233
Forestry and Range Mgt.	200	120
Watershed Management	220	140
Biological Sciences		
Biological Science	b	b
Biology, General	184	117
Botany	202	129
Zoology	191	122
Anatomy and Histology	184	117
Bacteriology	184	117
Biochemistry	146	93
Biophysics	146	93
Entomology	220	140
Genetics	184	117
Pathology	216	134
Microbiology	184	117
Mathematical Sciences		
Applied Mathematics	b	b
Computer Science	b	b
Mathematics	b	b
Statistics	b	b
Physical Sciences		
Physical Science, General	154	92
Astrophysics	169	115
Astrogeophysics	169	115
Atmospheric Science	333	200
Chemistry	141	97
Geology	178	121
Physics	176	120
Engineering Physics	169	116
Astronomy	169	116

Discipline Category	ASF/FTE Faculty[a]	ASF/FTE Grad. Student[a]
Engineering Sciences		
Agricultural	160	106
Architectural	120	80
Chemical	146	93
Civil	133	80
Electrical	133	80
Geological	133	80
Geophysical	133	80
Mechanical	133	80
Metallulrgical	146	100
Mining	146	100
Petroleum	146	100
Petroleum Refining	146	100
General, Engineering Science	133	80
Industrial	133	80
Social Sciences		
Anthropology-Archaeology	366	233
Geography	333	200
Psychology	142	90
Arts and Crafts		
Architecture	120	80
Fine Arts	c	c
Commerical Arts	b	b
Industrial Arts and Crafts	b	b
Landscape Architecture	b	b
Music	c	c
Planning	120	80
Engineering Drawing, Graphics, Design	120	80
Business-General	b	b
Education	b	b
Home Economics		
General Home Economics	170	108
Family and Child Development	c	c
Clothing and Textiles	169	108
Food and Nutrition	220	140
Law	b	b
Journalism	b	b

a. Includes support space.

b. Needs vary so widely that a guideline cannot reasonably be established.

c. Included as part of teaching lab studios.

EXHIBIT 6.3 Unadjusted Research Lab Standards/Guidelines, Florida

	ASF/FTE Student or Position[a]		
Discipline Category	Research Faculty	Grad. I Students	Grad. II Students
Agriculture	450	90	450
Architecture	375	75	375
Area Studies	75	3	75
Biological Sciences	450	90	450
Business	75	3	75
Communications	375	75	375
Computer Science	75	3	75
Education	75	3	75
Engineering	450	90	450
Fine & Applied Arts	375	75	375
Foreign Languages	75	3	75
Health Professions	450	90	450
Home Economics	375	75	375
Law	75	3	75
Letters	75	3	75
Library Science	75	3	75
Mathematics	75	3	75
Physical Sciences	450	90	450
Psychology	375	75	375
Public Affairs	75	3	75
Social Sciences	75	3	75

a. Includes support space.

EXHIBIT 6.4 Unadjusted Research Lab Standards/Guidelines, Kansas

Discipline Category	ASF Per Faculty Research Unit[a,b]	ASF Per Grad. Student Beyond 4[b]
Agriculture	1300	250
Architecture	900	200
Area Studies	200	25
Biological Sciences	1300	250
Business	200	25
Communications	900	200
Computer Science	200	25
Education	200	25
Engineering	1300	250
Fine & Applied Arts	900	200
Foreign Languages	200	25
Health Professions	900	200
Home Economics	900	200
Law	200	25
Letters	200	25
Library Science	200	25
Mathematics	200	25
Military Sciences	--	--
Physical Sciences	1300	250
Psychology	900	200
Public Affairs	200	25
Social Sciences	200	25
Theology	200	25

a. Defined as one FTE research faculty plus four FTE graduate students.

b. Includes support space.

Information for California is presented in bold type at the bottom of the exhibit. Mean and median averages of total ASF generated have been calculated for all states, excluding California. This information is found just above the results for California. Finally, we have listed the ranking for California to show where the State's total ASF falls in relation to other states. The state whose standards generate the most ASF would be ranked 1/11, for example, while the state whose standards generate the least ASF would be ranked 11/11.

6.6 Summary of Findings: Research Laboratory Standards/Guidelines

There is no commonly accepted mathematical formula or concept among the states for calculating research laboratory needs. In addition, fewer states have standards/guidelines for such space. Only 13 of the 19 survey states had standards/guidelines for research labs and those formulas varied substantially.

The greatest variance among formulas is in the demand base itself. While enrollment is a logical base for classrooms and teaching laboratories, it is not a reliable indicator of the need for research space. Instead, the states use other factors such as FTE research faculty, total FTE faculty, graduate assistants, and post-doctoral fellows as a basis for estimating need. The result is that the state research lab standards and guidelines are significantly different from each other as are the definitions of the demand factors within the formulas.

EXHIBIT 6.5 Unadjusted Research Lab Standards/Guidelines, Maryland

Discipline Category	ASF per Research Module[a,b]
Module A	
0100 - Agriculture & Natural Resources	420
0400 - Biological Science	
0900 - Engineering	
1200 - Health Science (UMAB Only)	
1900 - Physical Science	
Module B	
0200 - Environmental Design	180
1000 - Fine & Applied Arts	
1200 - Health Science (all except UMAB)	
1300 - Home Economics	
2000 - Psychology	
Module C	
0300 - Area Studies	25
0500 - Business & Management	
0600 - Communications	
0700 - Computer Science	
0800 - Education	
1100 - Foreign Language	
1500 - Letters	
1600 - Library Science	
1700 - Mathematics	
2100 - Public Affairs	
2200 - Social Science	

a. Module Allocations:

1. One module per full-time faculty above the rank of instructor in programs in which doctoral degrees are offered or who are assigned as full-time research faculty or to research bureaus and institutes, or who is assigned to one of the health professions at UMAB.
2. One half module per full-time faculty above the rank of instructor in programs in which master's degrees are offered.
3. One module per full-time doctoral or post-doctoral student.
4. One half module per full-time master's student.
5. Two modules per HEGIS program category for which there are approved undergraduate degree programs only restricted to HEGIS program code areas 0100, 0400, 0900, 1900, and 2000.

b. Includes support space.

Another unique aspect of research lab formulas is the wide range of space values applied to the demand factors. Every state has unique values for discipline groupings, disciplines or sub-disciplines within their taxonomy of programs. These values are designed to fit the unique formulas and demand factors in each state. The combination of differing demand factors, unique definitions and widely differing discipline categories presents significant problems in trying to compare the standards/guidelines among the states.

In an attempt, however, to achieve as much comparability as possible we applied each state's formulas and standards to the characteristics outlined for the research university system prototype. The result shows how the total ASF of research lab space would differ for each of the 11 states for which comparisons could be made. As shown in Exhibit 6.26, using this methodology, the total ASF generated by California's standards is 20 percent less than the mean of ASF generated by other states' standards. Three factors contribute to this result:

- First, California has not updated research space since 1955. Other states have made more recent adjustments, increasing research space requirements.
- Second, other states provide graduate level teaching lab space separate from research lab allowances. California generates graduate level teaching lab space out of their research lab standards.
- Finally, other states specifically recognize contract and grant positions as demand units for estimating space needs while California does not. Since the growing number of post doctoral fellows are funded from grants and contracts, this has a substantial impact on research lab space allowances.

EXHIBIT 6.6 Unadjusted Research Lab Standards/Guidelines, Nebraska

Discipline	ASF/Research Position or Student[a]
Agriculture	
General Agriculture	20
Agriculture Biostatistics	220
Agriculture Biochemistry	425
Agricultural Communications	40
Agricultural Economics	20
Agricultural Education	40
Agricultural Engineering	300
Agronomy	365
Animal Science	350
Biomedical and Information Systems and AGNET	220
Conservation & Survey	350
Entomology	260
Food Science and Technology	345
Forestry, Fisheries, & Wildlife	220
Horticulture	300
Plant Pathology	220
Veterinary Science	475
Architecture	80
Arts and Sciences	
Actuarial Science	20
African-Black Studies	20
Anthropology	380
Art	
Drawing, Painting	225
Sculpture, Ceramics, Pottery	225
Art History	40
Biology	300
Chemistry	
General	430
Biochemistry	300
Classics	20
English	20
Computer Science	40
Dramatic Arts	20
Environmental Health	220
Geography	100
Geology	385
History	20
International Studies	20
Life Sciences	
General	450
Biochemistry	220
Cell Biology-Genetics	300
Ecology, Evolution & Behavior	300
Microbiology	220
Physiology	220
Plant and Animal Biology	220
Plant Pathology	220
Mathematics and Statistics	20
Modern Languages and Literature	20
Music	
General	205
Individual Practice	0
Group Practice	0
History and Appreciation	40
Philosophy	20
Physics and Astronomy	380
Political Science	20
Psychology	220
ROTC	0
Sociology	25
Speech Communications	60
Theatre Arts	15
Business	
General	20
Accounting	20
Bureau of Business Research	20
Economics	20
Finance	20
Management	20
Marketing	20
Engineering and Technology	
Chemical Engineering	350
Civil Engineering	450
Construction Management	40
Electrical Engineering	300
Engineering Mechanics	40
Industrial Engineering	160
Mechanical Engineering	300
Home Economics	
Education and Family Resources	40
Human Development and the Family	45
Human Nutrition and Food Service Management	300
Textiles, Clothing and Design	220
Interior Design	100
Journalism	40
Law	80
Public Affairs and Community Service	20
Teachers College	
Adult and Continuing Education	20
Barkley Memorial Center	225
Speech Pathology and Audiology	40
Educational Administration	20
Educational Psychology and Social Foundations	30
Elementary Education	100
Curriculum and Instruction	100
Counseling and Special Education	40
Health, PE, and Recreation	100
Secondary Education	20

a. Includes support space.

EXHIBIT 6.7 Unadjusted Research Lab Standards/Guidelines, New Hampshire

Discipline	ASF per FTE Research Faculty[a]	ASF per FTE Graduate Student[a]
Agriculture	540	270
Architecture	450	225
Area Studies	90	9
Biological Sciences	540	270
Business	90	9
Communications	450	225
Computer Science	90	9
Education	90	9
Physical Education	90	9
Engineering	540	270
Fine and Applied Arts	450	225
Foreign Languages	90	9
Health Professions	540	270
Home Economics	450	225
Law	0	0
Letters	90	9
Library Science	90	9
Mathematics	90	9
Military Science	0	0
Physical Sciences	540	270
Psychology	450	225
Public Affairs	90	9
Social Sciences	90	9
Industrial Training	---	---

a. Includes support space.

EXHIBIT 6.8 Unadjusted Research Lab Standards/Guidelines, Ohio

Discipline Category	ASF/Module[a]
Art	150
Biology	275
Botany	275
Chemistry	275
Engineering	
Aeronautical	400
Chemical	350
Civil	375
Electrical	350
Industrial	300
Mechanical	350
All Others	350
Geology	275
Humanities	100
Physics	275
Psychology	225
Social Sciences	
Anthropology	200
All Others	100
Zoology	275
Others	Pattern after above

a. Includes support space.

EXHIBIT 6.9 Unadjusted Research Lab Standards/Guidelines, Ontario

Discipline Category	ASF/FTE Faculty[a]	ASF/ Non-Faculty Researchers and FTE Graduate Students[a]
Group A	484	242.0
Agriculture (excluding Agricultural Economics), Biochemistry, Biology, Biophysics, Microbiology, Physiology, Botany, Zoology, Astronomy, Chemistry, Geology, Metereology, Oceanology, Physics, Medicine, and Veterinary Medicine		
Group B	323	161.5
Engineering, Forestry, Dentistry, Optometry, Dental Hygiene, Medical Technology, Pharmacy, Public Health, Metallurgy, Materials Science		
Group C	215	107.5
Kinetics, Kinesiology, Psychology, Rehab. Medicine, and Medical Illustration		
Group D	108	54.0
Physical and Health Education, Recreation, Library Science, Anthropology, Archaeology, Geography, Environmental Studies, Household Science, and Computer Science		
Group E	11	5.5
Other Education, Fine and Applied Arts, Humanities, Law, Social Work, Commerce, Business, Economics, Ag. Economics, Political Science, Sociology, Military Studies, Linguistics, Architecture, Nursing, Actuarial Science, and Mathematics		

a. Includes support space.

EXHIBIT 6.10 Unadjusted Research Lab Standards/Guidelines, Oregon

Discipline Category	ASF/FTE Faculty[a]
Group I	0
Business and Management	
Economics	
Languages and Linguistics	
Literature and History	
Math	
Philosophy	
Political Science and Administration	
Group II	30
Computer Science	
Education	
Fine and Applied Arts - primarily non-studio	
Social Sciences (General Psychology, Sociology, etc.)	
Theoretical Studies (Public Affairs & Services, etc.)	
Group III	110
Architecture and Environmental Sciences	
Communications and Theater (Films, TV, etc.)	
Home Economics - Non-Laboratory Setting	
Music	
Physical Education	
Social/Physical Science (Anthropology, Geography, etc.)	
Group IV	300
Engineering (Industrial, General)	
Fine and Applied Arts - Studio	
Home Economics - Laboratory setting (Foods, Textiles, etc.)	
Natural Sciences (Biology, Botany, Zoology, etc.)	
Physical Sciences (Chemistry, Geology, Pharmacy, Physics, etc.)	
Psychology - Experimental	
Clinical Sciences - Medical	
Dental	
Group V	360
Agriculture and Natural Resources (Crop Sciences, Animal Sciences, Forestry, etc.)	
Engineering (Chemical, Civil, Mechanical and those not included in Group IV)	
Basic Sciences - Medical	

a. Includes support space.

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EXHIBIT 6.11 Unadjusted Research Lab Standards/Guidelines, Utah

Discipline Category	ASF/FTE Faculty[a]
Arts and Letters, Humanities, Social and Behavioral Sciences, Business, Education, General Education, Law, Health, Business, Technology, Communications, Physical Education.	44
Architecture and Fine Arts	1,400
Agriculture and Natural Sciences, Pharmacy	1,400
Allied Health Professions	375
Nursing	375
Engineering	1,400

a. Includes support space.

EXHIBIT 6.13 Unadjusted Research Lab Standards/Guidelines, Wisconsin

Discipline Category	ASF/Research Demand Unit[a,b]
Agriculture	33
Engineering	31
Humanities	3
Life Sciences	28
Physical Sciences	29
Social Sciences	8

a. RDU = three (FTE teaching faculty) + 15 (FTE research faculty) + three (HC graduate degree candidates conducting research) + 12 (HC doctoral degree candidates) + 15 (FTE postdoctoral students).

b. Includes support space.

EXHIBIT 6.12 Unadjusted Research Lab Standards/Guidelines, Virginia

Discipline Category	ASF/PFE Faculty Member Engaged in Research[a]	FTE Graduate Students Accommodated in the ASF Provided for Each Faculty Member[a]	Additional ASF per FTE Graduate Student Engaged in Research[a]	ASF/FTE Research Faculty and Graduate Assistant for Research Office[a]
Group 1	1,100	4	225	180
Agricultural and Natural Resources (0100)				
Engineering (0900 and 4904)				
Computer Science (0700)				
Biological Sciences (0400 & 4902)				
Applied Mathematics and Statistics (1703)				
Physical Sciences (1900)				
Group 2	750	4	175	180
Architecture and Environmental Design (0200)				
Fine and Applied Arts (1000)				
Home Economics (1300)				
Psychology (2000)				
Communications (0600)				
Health Professions (1200)				
Group 3	None	None	None	N/A
Education (0800)				
Area Studies (0300)				
Business and Management (0500)				
Foreign Languages (1100)				
Letters (1500)				
Library Science (1600)				
Mathematics (1700) except (1703)				
Public Affairs and Services (2100)				
Law (1400)				
Social Sciences (2200)				

a. Includes support space.

EXHIBIT 6.14 Crosswalk of Colorado's Research Lab Standards/Guidelines to California's Discipline Categories

Discipline	ASF per FTE Faculty	ASF/FTE Graduate Student
Administration	25.0	25.0
Agricultural Biological Science	244.0	155.0
Agricultural Economics	220.0	140.0
Agricultural Science	244.0	155.0
Anthropology	366.0	233.0
Architecture (Environmental)	120.0	80.0
Arts, Performing	120.0	80.0
Arts, Visual	54.4	54.4
Biological Sciences	55.8	55.8
Computer Science	29.8	29.8
Education	25.0	25.0
Engineering Sciences	133.0	80.0
Engineering, Agricultural	160.0	106.0
Engineering, Chemical	146.0	93.0
Foreign Languages	25.0	25.0
Geography	333.0	200.0
International Relations	25.0	25.0
Journalism	25.0	25.0
Law	25.0	25.0
Letters	25.0	25.0
Library Sciences	59.0	59.0
Mathematical Sciences	25.0	25.0
Physical Science	154.0	92.0
Psychology	142.0	90.0
Social Ecology	41.3	41.3
Social Sciences, General	40.3	40.3
Social Welfare	25.0	25.0
Speech	25.0	25.0
Studies, Applied Behavior	25.0	25.0
Studies, Creative	25.0	25.0
Studies, Environmental	25.0	25.0
Studies, Interdisciplinary	25.0	25.0
Weighted Average	92.5	60.9

EXHIBIT 6.15 Crosswalk of Florida's Research Lab Standards/Guidelines to California's Discipline Categories

Discipline	ASF/FTE Research Faculty	ASF/FTE Grad. II Student	ASF/FTE Grad. I Student
Administration	75	75	3
Agricultural Biological Science	450	450	90
Agricultural Economics	450	450	90
Agricultural Science	450	450	90
Anthropology	75	75	3
Architecture (Environmental)	375	375	75
Arts, Performing	375	375	75
Arts, Visual	375	375	75
Biological Sciences	450	450	90
Computer Science	75	75	3
Education	75	75	3
Engineering Sciences	450	450	90
Engineering, Agricultural	450	450	90
Engineering, Chemical	450	450	90
Foreign Languages	75	75	3
Geography	75	75	3
International Relations	75	75	3
Journalism	375	375	75
Law	75	75	3
Letters	75	75	3
Library Sciences	75	75	3
Mathematical Sciences	75	75	3
Physical Science	450	450	90
Psychology	375	375	75
Social Ecology	75	75	3
Social Sciences, General	75	75	3
Social Welfare	75	75	3
Speech	375	375	75
Studies, Applied Behavior	375	375	75
Studies, Creative	75	75	3
Studies, Environmental	75	75	3
Studies, Interdisciplinary	75	75	3
Weighted Average	250.7	241.7	41.9

EXHIBIT 6.16 Crosswalk of Kansas' Research Lab Standards/Guidelines to California's Discipline Categories

Discipline	ASF per Faculty Research Unit	ASF per Grad. Student Above Those in Research Unit
Administration	200	25
Agricultural Biological Science	1300	250
Agricultural Economics	1300	250
Agricultural Science	1300	250
Anthropology	200	25
Architecture (Environmental)	900	200
Arts, Performing	900	200
Arts, Visual	900	200
Biological Sciences	1300	250
Computer Science	200	25
Education	200	25
Engineering Sciences	1300	250
Engineering, Agricultural	1300	250
Engineering, Chemical	1300	250
Foreign Languages	200	25
Geography	200	25
International Relations	200	25
Journalism	900	200
Law	200	25
Letters	200	25
Library Sciences	200	25
Mathematical Sciences	200	25
Physical Science	1300	250
Psychology	900	200
Social Ecology	200	25
Social Sciences, General	200	25
Social Welfare	200	25
Speech	200	25
Studies, Applied Behavior	200	25
Studies, Creative	200	25
Studies, Environmental	900	200
Studies, Interdisciplinary	200	25
Weighted Average	693.0	124.5

EXHIBIT 6.17 Crosswalk of Maryland's Research Lab Standards/Guidelines to California's Discipline Categories

Discipline	ASF per Research Position	ASF per Graduate Student
Administration	25	12.5
Agricultural Biological Science	420	210.0
Agricultural Economics	420	210.0
Agricultural Science	420	210.0
Anthropology	25	12.5
Architecture (Environmental)	180	90.0
Arts, Performing	180	90.0
Arts, Visual	180	90.0
Biological Sciences	420	210.0
Computer Science	25	12.5
Education	25	12.5
Engineering Sciences	420	210.0
Engineering, Agricultural	420	210.0
Engineering, Chemical	420	210.0
Foreign Languages	25	12.5
Geography	25	12.5
International Relations	25	12.5
Journalism	25	12.5
Law	25	12.5
Letters	25	12.5
Library Sciences	25	12.5
Mathematical Sciences	25	12.5
Physical Science	420	210.0
Psychology	180	90.0
Social Ecology	25	12.5
Social Sciences, General	25	12.5
Social Welfare	25	12.5
Speech	25	12.5
Studies, Applied Behavior	180	90.0
Studies, Creative	25	12.5
Studies, Environmental	180	90.0
Studies, Interdisciplinary	25	—

EXHIBIT 6.18 Crosswalk of Nebraska's Research Lab Standards/Guidelines to California's Discipline Categories

Discipline	ASF/HC Position Needing Lab Space	ASF/HC Graduate Student
Administration	20	20
Agricultural Biological Science	425	425
Agricultural Economics	20	20
Agricultural Science	350	350
Anthropology	380	380
Architecture (Environmental)	80	80
Arts, Performing	20	20
Arts, Visual	225	225
Biological Sciences	300	300
Computer Science	40	40
Education	20	20
Engineering Sciences	300	300
Engineering, Agricultural	300	300
Engineering, Chemical	350	350
Foreign Languages	20	20
Geography	100	100
International Relations	20	20
Journalism	40	40
Law	80	80
Letters	20	20
Library Sciences	20	20
Mathematical Sciences	20	20
Physical Science	380	380
Psychology	220	220
Social Ecology	25	25
Social Sciences, General	25	25
Social Welfare	25	25
Speech	20	20
Studies, Applied Behavior	220	220
Studies, Creative	20	20
Studies, Environmental	220	220
Studies, Interdisciplinary	20	20
Weighted Average	153.79	158.0

EXHIBIT 6.19 Crosswalk of New Hampshire's Research Lab Standards/Guidelines to California's Discipline Categories

Discipline	ASF per Research FTE Faculty	ASF per FTE Graduate Student
Administration	90	9
Agricultural Biological Science	540	270
Agricultural Economics	540	270
Agricultural Science	540	270
Anthropology	90	9
Architecture (Environmental)	450	225
Arts, Performing	450	225
Arts, Visual	450	225
Biological Sciences	540	270
Computer Science	90	9
Education	90	9
Engineering Sciences	540	270
Engineering, Agricultural	540	270
Engineering, Chemical	540	270
Foreign Languages	90	9
Geography	90	9
International Relations	90	9
Journalism	90	9
Law	0	0
Letters	90	9
Library Sciences	90	9
Mathematical Sciences	90	9
Physical Science	540	270
Psychology	90	9
Social Ecology	90	9
Social Sciences, General	90	9
Social Welfare	90	9
Speech	90	9
Studies, Applied Behavior	90	9
Studies, Creative	90	9
Studies, Environmental	90	9
Studies, Interdisciplinary	90	9
Weighted Average	284.6	119.3

EXHIBIT 6.20 Crosswalk of Ohio's Research Lab Standards/Guidelines to California's Discipline Categories

Discipline	ASF/Module
Administration	100
Agricultural Biological Science	275
Agricultural Economics	100
Agricultural Science	275
Anthropology	200
Architecture (Environmental)	275
Arts, Performing	150
Arts, Visual	150
Biological Sciences	275
Computer Science	100
Education	100
Engineering Sciences	350
Engineering, Agricultural	350
Engineering, Chemical	350
Foreign Languages	100
Geography	100
International Relations	100
Journalism	100
Law	100
Letters	100
Library Sciences	100
Mathematical Sciences	100
Physical Science	275
Psychology	225
Social Ecology	100
Social Sciences, General	100
Social Welfare	100
Speech	100
Studies, Applied Behavior	225
Studies, Creative	100
Studies, Environmental	225
Studies, Interdisciplinary	100
Weighted Average	172.3

EXHIBIT 6.21 Crosswalk of Ontario's Research Lab Standards/Guidelines to California's Discipline Categories

Discipline	ASF per FTE Faculty	ASF per Non-Faculty and FTE Graduate Student
Administration	11	5.5
Agricultural Biological Science	484	242.0
Agricultural Economics	11	5.5
Agricultural Science	484	242.0
Anthropology	108	54.0
Architecture (Environmental)	11	5.5
Arts, Performing	11	5.5
Arts, Visual	11	5.5
Biological Sciences	484	242.0
Computer Science	108	54.0
Education	11	5.5
Engineering Sciences	323	161.5
Engineering, Agricultural	323	161.5
Engineering, Chemical	323	161.5
Foreign Languages	11	5.5
Geography	108	54.0
International Relations	11	5.5
Journalism	11	5.5
Law	11	5.5
Letters	11	5.5
Library Sciences	108	54.0
Mathematical Sciences	11	5.5
Physical Science	484	242.0
Psychology	215	107.5
Social Ecology	11	5.5
Social Sciences, General	11	5.5
Social Welfare	11	5.5
Speech	11	5.5
Studies, Applied Behavior	11	5.5
Studies, Creative	11	5.5
Studies, Environmental	108	54.0
Studies, Interdisciplinary	11	5.5
Weighted Average	176.6	81.7

EXHIBIT 6.22 Crosswalk of Oregon's Research Lab Standards/Guidelines to California's Discipline Categories

Discipline	ASF/FTE Faculty
Administration	0
Agricultural Biological Science	360
Agricultural Economics	360
Agricultural Science	360
Anthropology	110
Architecture (Environmental)	110
Arts, Performing	110
Arts, Visual	300
Biological Sciences	300
Computer Science	30
Education	30
Engineering Sciences	300
Engineering, Agricultural	360
Engineering, Chemical	360
Foreign Languages	0
Geography	110
International Relations	0
Journalism	110
Law	0
Letters	0
Library Sciences	30
Mathematical Sciences	0
Physical Science	300
Psychology	300
Social Ecology	30
Social Sciences, General	30
Social Welfare	30
Speech	110
Studies, Applied Behavior	300
Studies, Creative	30
Studies, Environmental	300
Studies, Interdisciplinary	30
Weighted Average	151.0

EXHIBIT 6.23 Crosswalk of Utah's Research Lab Standards/Guidelines to California's Discipline Categories

Discipline	ASF/FTE Faculty
Administration	44
Agricultural Biological Science	1,400
Agricultural Economics	1,400
Agricultural Science	1,400
Anthropology	44
Architecture (Environmental)	1,400
Arts, Performing	1,400
Arts, Visual	1,400
Biological Sciences	1,400
Computer Science	44
Education	44
Engineering Sciences	1,400
Engineering, Agricultural	1,400
Engineering, Chemical	1,400
Foreign Languages	44
Geography	44
International Relations	44
Journalism	44
Law	44
Letters	44
Library Sciences	44
Mathematical Sciences	44
Physical Science	1,400
Psychology	375
Social Ecology	44
Social Sciences, General	44
Social Welfare	44
Speech	44
Studies, Applied Behavior	375
Studies, Creative	44
Studies, Environmental	1,400
Studies, Interdisciplinary	44
Weighted Average	675.6

EXHIBIT 6.24 Crosswalk of Virginia's Research Lab Standards/Guidelines to California's Discipline Categories

Discipline	ASF/FTE Research FacultyUnit	ASF/FTE for Additional Graduate Students Above Four/Faculty	Research Office Space per FTE Faculty
Administration	--	--	180
Agricultural Biological Science	1,100	225	180
Agricultural Economics	--	--	180
Agricultural Science	1,100	225	180
Anthropology	--	--	180
Architecture (Environmental)	750	175	180
Arts, Performing	750	175	180
Arts, Visual	750	175	180
Biological Sciences	1,100	225	180
Computer Science	1,100	225	180
Education	--	--	180
Engineering Sciences	1,100	225	180
Engineering, Agricultural	1,100	225	180
Engineering, Chemical	1,100	225	180
Foreign Languages	--	--	180
Geography	--	--	180
International Relations	--	--	180
Journalism	750	175	180
Law	--	--	180
Letters	--	--	180
Library Sciences	--	--	180
Mathematical Sciences	--	--	180
Physical Science	1,100	225	180
Psychology	750	175	180
Social Ecology	750	175	180
Social Sciences, General	--	--	180
Social Welfare	--	--	180
Speech	--	--	180
Studies, Applied Behavior	--	--	180
Studies, Creative	--	--	180
Studies, Environmental	750	175	180
Studies, Interdisciplinary	--	--	180
Weighted Average	503.1	99.8	180.0

EXHIBIT 6.25 Assumed Research Lab Related Characteristics of Prototype Research University System

Alternative Research Lab Demand Units	Prototype System Demand Units Under Operating Budgets	
	A[a]	B[b]
State Funded		
FTE Faculty	7,600	6,810
FTE Graduate Students (Academic Year Average)		
Graduate I	17,126	17,126
Graduate II	8,550	8,550[c]
FTE Teaching Assistants	2,460	2,460
FTE Research Assistants	810	810
Percent of State Funded Faculty Effort Spent On Research	N/A	30%
FTE Research Technicians	720	720
FTE Post Doctoral Fellows		0
Contract and Grant Funded		
FTE Research Faculty	350	1,140
FTE Research Assistants	170	170
FTE Research Technicians	750	750
FTE Post Doctoral Fellows	1,700	1,700
Total, Both Fund Categories		
FTE Faculty	7,950	7,950
FTE Graduate Students (Ac. Yr. Avg.)		
Graduate I	17,126	17,126
Graduate II	8,550	8,550[c]
FTE Teaching Assistants	2,460	2,460
FTE Research Assistants	980	980
FTE Research Technicians	1470	1470
FTE Post Doctoral Fellows	1700	1700
Faculty in Departments with Highest Degree		
Doctorate	5,700	5,700
Master's	1,900	1,900

a. Budget based upon funding almost all faculty from state funds, not separately budgeting state funded faculty research efforts, and not budgeting teaching faculty by level.

b. Budget based upon funding almost all contract and grant faculty efforts from contract and grant budget, separately budgeting state funded faculty research efforts, and separately budgeting teaching faculty by program level.

c. Classification of Graduate II based upon completion of master's degree.

EXHIBIT 6.26 *ASF of Research Lab Space Generated by the Surveyed State Formulas for the Prototype Research University System*

State	ASF for State Funded Programs[a]	ASF for Contract and Grant Programs[a]	Total ASF for All Programs	
Colorado	2,266,668	32,375	2,299,043	
Florida	3,296,294	285,798	3,582,092	
Kansas	3,595,047	790,020	4,385,067	
Maryland	4,457,319	66,395	4,523,714	
Nebraska	5,149,512	55,300	5,204,812	
New Hampshire	3,644,585	324,444	3,969,029	
Ohio	c	c	c	
Ontario	3,574,988	293,156	3,868,144	
Oregon	1,944,835	78,520	2,023,355	
Utah	5,134,560	236,460	5,371,020	
Virginia	3,288,273	239,085	3,527,358	
Wisconsin	c	c	c	
Mean (Excluding California)	3,635,208	240,155	3,875,363	
Median (Excluding California)	3,585,018	237,773	3,918,587	
				Rank
California	**3,098,246[b]**	**N/A**	**3,098,246[b]**	**9/11**

a. Calculated by applying weighted average space factor values (Exhibits 6.14 to 6.24) to prototype characteristics in accordance with each state's formula outlined in Section 6.1.

b. California's total ASF for research lab space, 3,472,859, has been reduced by 374,613; the average graduate teaching lab space generated by other states' standards. California must use research lab space for scheduled graduate teaching labs. The full range of space factors for other states are presented in Exhibit 5.4.3 and discussed in Section 5.5.

c. Cannot be computed.

7 Standards/Guidelines for Academic Office Space

After classrooms, the most often used higher education facility standards/guidelines among the states are those for office facilities.

7.1 Formulas for Office Space

Like classrooms, the methodologies used by most states for calculating faculty office space needs are relatively simple. Unlike classrooms, however, there is no commonly accepted methodology, though most of the methodologies can be grouped into three categories.

Category 1: Formulas based on a space allowance per FTE student;

Category 2: Formulas based on a space allowance per FTE faculty (office space for all other staff members are loaded into the space allowance per faculty); and

Category 3: Formulas based on a space allowance for each type of academic position (e.g., faculty, clerical, graduate assistants, doctoral students, postdoctoral fellows, etc.).

Within these three types of formulas, the states have introduced a variety of other considerations including:

(1) different allowances for different discipline groupings;

(2) different allowances for different classes of positions; and

(3) different allowances by faculty rank.

7.2 Unadjusted Standards and Guidelines for Office Space

Exhibit 7.1 shows the specific unadjusted office space standards/guidelines of the surveyed states. Implicit in this exhibit is a description of the specific formulas used by the states included in our survey. Standards/guidelines have been adjusted to include service and administrative support space. In the case of California Community Colleges, office space standards published in regulations include an allowance for all administration space, e.g., admissions, bursar, financial aid. Therefore, the standards have been adjusted to exclude the allowance for administration space.

7.3 Normalized Office Space ASF Generated by Applying Surveyed States' Standards

Exhibits 7.2, 7.3 and 7.4 present the total space calculated for each prototype system using the state specific criteria. All calculations include service and administrative support space.

Exhibits 7.5, 7.6 and 7.7 present a comparison of total ASF generated by applying each state's standards to the respective prototype characteristics. Information for California is presented in bold type at the bottom of each exhibit. Mean and median averages of total ASF generated have been calculated for all states, excluding California. This information is found just above the results for California on each page. Finally, we have listed the ranking for California to show where the State's total ASF falls in relation to other states. The state whose standards generate the most ASF would be ranked 1/11, for example, while the state whose standards generate the least ASF would be ranked 11/11.

7.4 Summary of Findings: Academic Office Space Standards/Guidelines

The methodologies used by most states for calculating faculty office space needs are straightforward and relatively simple. However, as in the case of research labs, states use a variety of demand factors in their formulas. These include an allowance based on total FTE enrollment, an allowance for

EXHIBIT 7.1 Office Space Standards/Guidelines

Demand Unit	California CC[a]	California CSU[b]	California UC[b]	Colorado	Florida	Kansas
	Assignable Square Feet					
State-Funded Academic Staff						
FTE Faculty				135	145	165
Faculty Allowance	[illegible]	[illegible]	138.7			
Support Staff Allowance per Faculty			39.5			
FTE Academic Support Staff				95	145	165
FTE Graduate Assistants				75	145	165
Teaching Assistant Allowance			138.7			
Support Staff Allowance per Teaching Assistant			39.5			
FTE Post Doctoral Fellows				--	145	165
FTE Doctoral Students				--	--	--
Graduate Students			25.2[c]	--	--	--
Contract and Grant Funded Academic Staff						
FTE Faculty				135	145	165
FTE Academic Support Staff				95	145	165
FTE Graduate Assistants				75	145	165
FTE Post Doctoral Fellows				--	145	165
FTE Doctoral Students				--	--	--
Others				--	145	--
FTE Enrollments						
Lower				--	--	--
Upper				--	--	--
Graduate				--	--	--

Demand Unit	Maryland	Nebraska	New Hampshire	New Jersey	New York
	Assignable Square Feet				
State-Funded Academic Staff					
FTE Faculty	140	145	160	140	160
FTE Academic Support Staff	140	145	145	140	120
FTE Graduate Assistants	70	125	55	--	120
FTE Post Doctoral Fellows	140	125	--	140	--
FTE Doctoral Students	35	--	--	--	--
Other FTE	--	125	--	140	--
Contract and Grant Funded Academic Staff					
FTE Faculty	140	145	160	140	160
FTE Academic Support Staff	140	145	145	140	120
FTE Graduate Assistants	70	125	55	--	120
FTE Post Doctoral Fellows	140	125	--	140	--
Others	--	125	145	140	--
FTE Enrollments					
Lower	--	--	--	--	--
Upper	--	--	--	--	--
Graduate	--	--	--	--	--

a. Estimated proportion of Title 5 allowance of 140 ASF per faculty FTE for academic and administration space.

b. Weighted average for all disciplines.

c. Graduate student headcount.

EXHIBIT 7.1 (Continued)

	Assignable Square Feet					
	Ohio					
Demand Unit	Community Colleges	Universities	Oklahoma	Ontario	Oregon	Tennessee
State-Funded Academic Staff						
FTE Faculty	135	140	--	161	150	--
FTE Academic Support Staff	135	140	--	140	150	--
FTE Graduate Assistants	135	140	--	43	150	--
FTE Post Doctoral Fellows	--	--	--	--	--	--
FTE Doctoral Students	--	--	--	--	--	--
Other FTE	--	--	--	--	--	--
Contract and Grant Funded Academic Staff						
FTE Faculty	--	140	--	161	150	--
FTE Academic Support Staff	--	140	--	140	150	--
FTE Graduate Assistants	--	140	--	43	150	--
FTE Post Doctoral Fellows	--	--	--	--	--	--
Others	--	140	--	--	--	--
FTE Enrollments						
Lower	--	--	6.25	--	--	9.33
Upper	--	--	8.75	--	--	9.33
Graduate	--	--	15.00	--	--	9.33

	Assignable Square Feet					
		Virginia				
Demand Unit	Utah	Two-Year	State U.	Research U.	Washington Community Colleges	Wisconsin
State-Funded Academic Staff						
FTE Faculty	170	140	150	180	100	145
FTE Academic Support Staff	170	--	--	--	100	145
FTE Graduate Assistants	--	--	--	--	--	145
FTE Post Doctoral Fellows	--	--	--	--	--	110
FTE Doctoral Students	--	--	--	--	--	--
Other FTE	170	--	--	--	--	--
Contract and Grant Funded Academic Staff						
FTE Faculty	170		150	180	--	145
FTE Academic Support Staff	170	--	--	--	--	145
FTE Graduate Assistants	--	--	--	--	--	145
FTE Post Doctoral Fellows	--	--	--	--	--	110
Others	170	--	--	--	--	--
FTE Enrollments						
Lower	--	--	--	--	--	--
Upper	--	--	--	--	--	--
Graduate	--	--	--	--	--	--

each type of position or an allowance per FTE faculty (or faculty and teaching assistants) which includes space for support personnel. California falls in the latter category. As a result, the space allowances for academic office space are not directly comparable. Therefore, each state's criteria were applied to the respective prototype characteristics to calculate the total ASF of academic office space needs for each type of institution.

EXHIBIT 7.2 Prototype Office Space Calculations, Community College System

	Assignable Square Feet[a]				
Demand Unit	California	Colorado	Florida	Maryland	New Jersey
State-Funded Academic Staff					
FTE Faculty	2,727,735	3,876,255	4,163,385	4,019,820	4,019,820
FTE Academic Support Staff	--	272,745	416,295	401,940	401,940
FTE Graduate Assistants	--	--	--	--	--
FTE Post Doctoral Fellows	--	--	-	--	--
FTE Doctoral Students	--	--	--	--	--
Other FTE	--	--	--	--	--
Contract and Grant Funded Academic Staff					
FTE Faculty	--	--	--	--	--
FTE Academic Support Staff	--	--	--	--	--
FTE Graduate Assistants	--	--	--	--	--
FTE Post Doctoral Fellows	--	--	--	--	--
Others	--	--	--	--	--
FTE Enrollments					
Lower					
Upper					
Graduate					
TOTAL	2,727,735	4,149,000	4,579,680	4,421,760	4,421,760

Demand Unit	Ohio	Tennessee	Utah	Virginia	Washington	Wisconsin
State-Funded Academic Staff						
FTE Faculty	3,876,255	--	4,881,210	4,019,820	2,871,300	4,163,385
FTE Academic Support Staff	387,545	--	488,070	401,940	287,100	416,295
FTE Graduate Assistants	--	--	--	--	--	--
FTE Post Doctoral Fellows	--	--	--	--	--	--
FTE Doctoral Students	--	--	--	--	--	--
Other FTE	--	--	--	--	--	--
Contract and Grant Funded Academic Staff						
FTE Faculty	--	--	--	--	--	--
FTE Academic Support Staff	--	--	--	--	--	--
FTE Graduate Assistants	--	--	--	--	--	--
FTE Post Doctoral Fellows	--	--	--	--	--	--
Others						
FTE Enrollments						
Lower		3,536,156				
Upper						
Graduate						
TOTAL	4,263,840	3,536,156	5,369,280	4,421,760	3,158,400	4,579,680

a. Total ASF calculated by applying each state's space allowance (Exhibit 7.1) to prototype criteria (Exhibit 3.6).

In the case of community colleges, application of California standards to the prototype generates fewer ASF than any other state surveyed. For the State University System prototype, California ranked sixteenth of seventeen, total ASF being 24 percent below the mean of other states. In the research university category, California was below average in total ASF and ranked thirteenth of the seventeen states surveyed.

EXHIBIT 7.3 Prototype Office Space Calculations, State University System

Demand Unit	Assignable Square Feet[a]							
	California	Colorado	Florida	Kansas	Maryland	Nebraska	New Hampshire	New Jersey
State-Funded Academic Staff								
FTE Faculty	2,152,586	1,898,100	2,038,700	2,319,900	1,968,400	2,038,700	2,249,600	1,968,400
FTE Academic Support Staff	--	270,750	413,250	470,250	399,000	413,250	413,250	399,000
FTE Graduate Assistants	--	87,000	168,200	191,400	81,200	145,000	63,800	162,400
FTE Post Doctoral Fellows	--	--	--	--	--	--		--
FTE Doctoral Students	--	--	--	--	--	--		--
Other FTE	--	--	--	--	--	--		--
Contract and Grant Funded Academic Staff								
FTE Faculty	--	78,705	84,535	96,195	81,620	84,535	93,280	81,620
FTE Academic Support Staff	--	5,510	8,410	9,570	8,120	8,410	8,410	8,120
FTE Graduate Assistants	--	7,500	14,500	16,500	7,000	12,500	5,500	14,000
FTE Post Doctoral Fellows	--	--	--	--	--	--	--	--
Others	--	--	8,120	--	--	7,000	8,120	--
FTE Enrollments								
Lower								
Upper								
Graduate								
TOTAL	2,152,586	2,347,565	2,735,715	3,103,815	2,545,340	2,709,395	2,841,960	2,633,540

Demand Unit	New York	Ohio	Oklahoma	Ontario	Oregon	Tennessee	Utah	Virginia	Wisconsin
State-Funded Academic Staff									
FTE Faculty	2,249,600	1,968,400	--	2,263,660	2,109,000	--	2,390,200	2,109,000	2,038,700
FTE Academic Support Staff	342,000	399,000	--	399,000	427,500	--	484,500	--	413,250
FTE Graduate Assistants	139,200	162,400	--	49,880	174,000	--	--	--	168,200
FTE Post Doctoral Fellows	--	--	----	--	----	--	----	--	--
FTE Doctoral Students	--	--	----	--	----	--	----	--	--
Other FTE	--	--	----	--	--	--	9,520	--	--
Contract and Grant Funded Academic Staff									
FTE Faculty	93,280	81,620	--	93,863	87,450	--	99,110	87,450	84,535
FTE Academic Support Staff	6,960	8,120	--	8,120	8,700	--	9,860	--	8,410
FTE Graduate Assistants	12,000	14,000	--	4,300	15,000	--	--	--	14,500
FTE Post Doctoral Fellows	--	--	----	--	----	--	----	--	--
Others	--	7,840	--	--	--	--	--	--	--
FTE Enrollments									
Lower			1,281,894			706,481			
Upper			2,691,964			1,059,721			
Graduate			1,283,580			270,607			
TOTAL	2,843,040	2,641,380	5,257,438	2,818,823	2,821,650	2,036,809	2,993,190	2,196,450	2,727,595

[a] **Total ASF calculated by applying each state's space allowance (Exhibit 7.1) to prototype criteria (Exhibit 3.7).**

EXHIBIT 7.4 Prototype Office Space Calculations, Research University System

	Assignable Square Feet[a]							
Demand Unit	California	Colorado	Florida	Kansas	Maryland	Nebraska	New Hampshire	New Jersey
State-Funded Academic Staff								
FTE Faculty	1,354,320	1,026,000	1,102,000	1,254,000	1,064,000	1,102,000	1,216,000	1,064,000
FTE Academic Support Staff	--	627,000	957,000	1,089,000	924,000	957,000	957,000	924,000
FTE Graduate Assistants	438,372	245,250	474,150	539,550	228,900	408,750	179,850	457,800
FTE Post Doctoral Fellows	--	--	0	--	--	--	--	--
FTE Doctoral Students	--	--	--	--	299,250		--	--
Other FTE	647,035	--	--	--	--		--	--
Contract and Grant Funded Academic Staff								
FTE Faculty	--	47,250	50,750	57,750	49,000	50,750	56,000	49,000
FTE Academic Support Staff	--	38,000	58,000	66,000	56,000	58,000	58,000	56,000
FTE Graduate Assistants	--	12,750	24,650	28,050	11,900	21,250	9,350	23,800
FTE Post Doctoral Fellows	--	--	246,500	280,500	238,000	212,500	--	--
Others	--	--	72,500	--	--	62,500	72,500	--
FTE Enrollments								
Lower								
Upper								
Graduate								
TOTAL	2,439,727	1,996,250	2,985,550	3,314,850	2,871,050	2,872,750	2,548,700	2,574,600

Demand Unit	New York	Ohio	Oklahoma	Ontario	Oregon	Tennessee	Utah	Virginia	Wisconsin
State-Funded Academic Staff									
FTE Faculty	1,216,000	1,064,000	--	1,223,600	1,140,000	--	1,292,000	1,368,000	1,102,000
FTE Academic Support Staff	792,000	924,000	--	924,000	990,000	--	1,122,000	--	957,000
FTE Graduate Assistants	392,400	457,800	--	140,610	490,500	--	--	--	474,150
FTE Post Doctoral Fellows	--	--	--	--	--	--	--	--	--
FTE Doctoral Students	--	--	--	--	--	--	--	--	0
Other FTE	--	--	--	--	--	--	--	--	--
Contract and Grant Funded Academic Staff									
FTE Faculty	56,000	49,000	--	56,350	52,500	--	59,500	63,000	47,250
FTE Academic Support Staff	48,000	56,000	--	56,000	60,000	--	68,000	--	54,000
FTE Graduate Assistants	20,400	23,800	--	7,310	25,500	--	--	--	22,950
FTE Post Doctoral Fellows	--	238,000	--	--	--	--	--	--	187,000
Others	--	--	--	--	--	--	85,000	--	--
FTE Enrollments									
Lower	--	--	630,581	--	--	403,583			
Upper	--	--	1,324,216	--	--	605,372			
Graduate	--	--	1,180,230	--	--	239,557			
TOTAL	2,524,800	2,812,600	3,135,027	2,407,870	2,758,500	1,248,512	2,626,500	1,431,000	2,844,350

[a] Total ASF calculated by applying each state's space allowance (Exhibit 7.1) to prototype criteria (Exhibit 3.8).

EXHIBIT 7.5 *ASF of Office Space Generated by the Surveyed State Formulas for the Prototype Community College System*

State	ASF for State Funded Positions	ASF for Contract and Grant Positions	Total ASF for All Positions	Rank
Colorado	4,149,000	N/A	4,149,000	
Florida	4,579,680	N/A	4,579,680	
Maryland	4,421,760	N/A	4,421,760	
New Jersey	4,421,760	N/A	4,421,760	
Ohio	4,263,840	N/A	4,263,840	
Tennessee	3,536,156	N/A	3,536,156	
Utah	5,369,280	N/A	5,369,280	
Virginia	4,421,760	N/A	4,421,760	
Washington	3,158,400	N/A	3,158,400	
Wisconsin	4,579,680	N/A	4,579,680	
Mean (Excluding California)		N/A	4,290,132	
Median (Excluding California)		N/A	4,421,760	
California	**2,727,735**	N/A	**2,727,735**	11/11

EXHIBIT 7.6 *ASF of Office Space Generated by the Surveyed State Formulas for the Prototype State University System*

State	ASF for State Funded Positions	ASF for Contract and Grant Positions	Total ASF for All Positions	Rank
Colorado	2,255,850	91,715	2,347,565	
Florida	2,628,270	107,445	2,735,715	
Kansas	2,981,550	122,265	3,103,815	
Maryland	2,448,600	96,740	2,545,340	
Nebraska	2,603,950	105,445	2,709,395	
New Hampshire	2,734,770	107,190	2,841,960	
New Jersey	2,529,800	103,740	2,633,540	
New York	2,730,800	112,240	2,843,040	
Ohio	2,537,640	103,740	2,641,380	
Oklahoma	5,257,438	N/A	5,257,438	
Ontario	2,712,540	106,283	2,818,823	
Oregon	2,710,500	111,150	2,821,650	
Tennessee	2,036,809	N/A	2,036,809	
Utah	2,884,220	108,970	2,993,190	
Virginia	2,109,000	87,450	2,196,450	
Wisconsin	2,620,150	107,445	2,727,595	
Mean (Excluding California)	2,565,743	105,130	2,828,357	
Median (Excluding California)	2,624,210	106,737	2,727,593	
California	**2,152,586**	N/A	**2,152,586**	16/17

EXHIBIT 7.7 ASF of Office Space Generated by the Surveyed State Formulas for the Prototype Research University System

State	ASF for State Funded Positions	ASF for Contract and Grant Positions	Total ASF for All Positions	Rank
Colorado	1,898,250	98,000	1,996,250	
Florida	2,605,650	379,900	2,985,550	
Kansas	2,882,550	432,300	3,314,850	
Maryland	2,516,150	354,900	2,871,050	
Nebraska	2,530,250	342,500	2,872,750	
New Jersey	2,445,800	128,800	2,574,600	
New Hampshire	2,425,350	123,350	2,548,700	
New York	2,400,400	124,400	2,524,800	
Ohio	2,445,800	366,800	2,812,600	
Oklahoma	3,135,027	N/A	3,135,027	
Ontario	2,288,210	119,660	2,407,870	
Oregon	2,620,500	138,000	2,758,500	
Tennessee	1,248,512	N/A	1,248,512	
Utah	2,499,000	127,500	2,626,500	
Virginia	1,368,000	63,000	1,431,000	
Wisconsin	2,533,150	311,200	2,844,350	
Mean (Excluding California)	2,365,162	222,165	2,559,557	
Median (Excluding California)	2,445,800	133,400	2,692,500	
California	**2,457,700**	**N/A**	**2,457,700**	**13/17**

Appendix A

Adjustments for Differences in Enrollment Counting Periods

Adjustments for Differences in Time of Day Enrollment Counts

1.0 Adjustments for Differences in Enrollment Counting Periods

For normalization purposes, we chose to adjust all standards/guidelines to an Academic Year (two semesters or three quarters) average. Accordingly, adjustments were made for those states that use a counting period other than an academic year average.

- Exhibit A shows the percentage increases <decreases> needed to convert fall semester based standards to an academic year average.
- Exhibit B shows the percentage increase <decrease> needed to convert 12 month average based standards to academic year average based standards (Washington only).
- Exhibit C shows the percentage increase <decrease> needed to convert modified 12 month average enrollment (i.e., Florida's counting method) based standards to academic year average based standards (Florida only).
- Exhibit D shows the percentage increase <decrease> needed to convert total annual enrollment based standards to academic year average based standards (Oklahoma only).

2.0 Adjustments for Differences in Time of Day Enrollment Counts

For normalization purposes, we chose to adjust all standards/guidelines to a full 24-hour day enrollment count. Accordingly, adjustments were made for those states that use only daytime enrollment counts. Exhibit E shows the decreases in standards necessary to adjust daytime enrollment based standards to 24-hour enrollment based standards.

EXHIBIT A *Base Factor Adjustments for Fall Enrollments Versus Academic Year Average Enrollments*[a]

	FTE Enrollment[b]			
Prototype System	Academic Year Average	Fall Term	Ratio: Fall Term to Academic Year Average	Percent Adjustment for Fall Counting[c]
Community Colleges	631,682	675,900	1.070	7.0
State Universities				
Lower	87,387	89,084	1.019	1.9
Upper	131,082	133,626	1.019	1.9
Graduate	35,565	36,255	1.019	1.9
Research Universities				
Lower	43,257	44,594	1.031	3.1
Upper	64,885	66,891	1.031	3.1
Graduate I	21,825	22,500	1.031	3.1
Graduate II	3,851	3,970	1.031	3.1

a. Applies to the standards/guidelines for Kansas, Maryland, Nebraska, New Hampshire, Ohio, Oregon, Tennessee, Utah and Wisconsin.

b. Derived from prototype system descriptions in Exhibits 3.6, 3.7 and 3.8 in the body of the report.

c. Calculated by subtracting 1.0 from the corresponding ratio number in the previous column and converting the result to a percentage.

EXHIBIT B Base Factor Adjustments for 12 Month Average Enrollments Versus Academic Year Average Enrollments[a]

	FTE Enrollment[b]			
Prototype System	Academic Year Average	12 Month Average	Ratio of 12 Month Average to Academic Year Average	Percent Adjustment for 12 Month Average[c]
Community Colleges	631,682	699,061	1.107	10.7

a. Applies to the standards/guidelines for Washington.

b. Derived from prototype system descriptions in Exhibits 3.6, 3.7 and 3.8 in the body of the report.

c. Calculated by subtracting 1.0 from the corresponding ratio number in the previous column and converting the result to a percentage.

EXHIBIT C Base Factor Adjustments for Modified 12 Month Average Enrollments Versus Academic Year Average Enrollments[a]

	FTE Enrollments[b]			
Prototype System	Academic Year Average	Modified 12 Month Average[d]	Ratio of Modified 12 Month to Academic Year Average	Percent Adjustment for Modified 12 Month Average[c]
Community College	631,682	548,878	.869	<13.1>
State Universities				
Lower	87,387	76,818	.879	<12.1>
Upper	131,082	115,226	.879	<12.1>
Graduate	35,565	32,049	.901	<9.9>
Research Universities				
Lower	43,257	37,788	.874	<12.6>
Upper	64,885	56,681	.874	<12.6>
Graduate I	21,825	20,309	.931	<6.9>
Graduate II	3,851	3,926	1.019	1.9

a. Applies to the standards/guidelines for Florida.

b. Derived from prototype system descriptions in Exhibits 3.6, 3.7 and 3.8 in the body of the report.

c. Calculated by subtracting 1.0 from the corresponding ratio number in the previous column and converting the result to a percentage.

d. Total enrollments for fall, spring and summer divided by 2.67 (the 2.67 is equivalent to Florida's actual practice of dividing total annual student credit hours by 40 at the undergraduate level and 32 at the graduate level).

EXHIBIT D *Base Factor Adjustments for Total Annual Enrollment Counts Versus Academic Year Average Enrollments*[a]

Prototype System	FTE Enrollments[b] Academic Year Average	Total Annual Enrollment	Ratio: Total Annual to Academic Year Average	Percent Adjustment for Total Annual Count[c]
State Universities				
Lower	87,387	205,103	2.347	134.7
Upper	131,082	307,653	2.347	134.7
Graduate	35,565	85,572	2.406	140.6
Research Universities				
Lower	43,257	100,893	2.332	133.2
Upper	64,885	151,339	2.332	133.2
Graduate I	21,825	54,[illegible]5	2.485	148.5
Graduate II	3,851	10,[illegible]2	2.722	172.2

a. Applies to the standards/guidelines for Oklahoma.

b. Derived from prototype system descriptions in Exhibits 3.6, 3.7 and 3.8 in the body of the report.

c. Calculated by subtracting 1.0 from the corresponding ratio number in the previous column and converting the result to a percentage.

EXHIBIT E *Base Factor Adjustments for Daytime Versus 24-Hour Enrollments*[a]

Prototype System	Ratio: Daytime Enrollments to to 24-Hour Enrollments[b]	Percent Adjustment for Daytime to 24-Hour Enrollments[c]
Community Colleges	.60	<40.0>
State Universities		
Lower	.85	<15.0>
Upper	.85	<15.0>
Graduate	.80	<20.0>
Research Universities		
Lower	.90	<10.0>
Upper	.85	<15.0>
Graduate I	.90	<10.0>
Graduate II	1.00	-----

a. Applies to the standards/guidelines for Colorado, Maryland, New York, Ontario, Tennessee and Washington.

b. Taken from the prototype system description in Exhibits 3.6, 3.7 and 3.8 in the body of the report.

c. Derived by subtracting 1.0 from the corresponding numbers in the ratio column and converting the result to a percentage.

CALIFORNIA POSTSECONDARY EDUCATION COMMISSION

THE California Postsecondary Education Commission is a citizen board established in 1974 by the Legislature and Governor to coordinate the efforts of California's colleges and universities and to provide independent, non-partisan policy analysis and recommendations to the Governor and Legislature.

Members of the Commission

The Commission consists of 15 members. Nine represent the general public, with three each appointed for six-year terms by the Governor, the Senate Rules Committee, and the Speaker of the Assembly. The other six represent the major segments of postsecondary education in California.

As of February 1990, the Commissioners representing the general public are:

Mim Andelson, Los Angeles;
C. Thomas Dean, Long Beach;
Henry Der, San Francisco;
Seymour M. Farber, M.D., San Francisco;
Rosalind K. Goddard, Los Angeles;
Helen Z. Hansen, Long Beach;
Lowell J. Paige, El Macero; *Vice Chair;*
Cruz Reynoso, Los Angeles; *Chair;* and
Stephen P. Teale, M.D., Modesto.

Representatives of the segments are:

Meredith J. Khachigian, San Clemente; appointed by the Regents of the University of California;

Theodore J. Saenger, San Francisco; appointed by the Trustees of the California State University;

John F. Parkhurst, Folsom; appointed by the Board of Governors of the California Community Colleges;

Harry Wugalter, Thousand Oaks; appointed by the Council for Private Postsecondary Educational Institutions;

Joseph D. Carrabino, Orange; appointed by the California State Board of Education; and

James B. Jamieson, San Luis Obispo; appointed by the Governor from nominees proposed by California's independent colleges and universities.

Functions of the Commission

The Commission is charged by the Legislature and Governor to "assure the effective utilization of public postsecondary education resources, thereby eliminating waste and unnecessary duplication, and to promote diversity, innovation, and responsiveness to student and societal needs."

To this end, the Commission conducts independent reviews of matters affecting the 2,600 institutions of postsecondary education in California, including community colleges, four-year colleges, universities, and professional and occupational schools.

As an advisory planning and coordinating body, the Commission does not administer or govern any institutions, nor does it approve, authorize, or accredit any of them. Instead, it cooperates with other State agencies and non-governmental groups that perform these functions, while operating as an independent board with its own staff and its own specific duties of evaluation, coordination, and planning,

Operation of the Commission

The Commission holds regular meetings throughout the year at which it debates and takes action on staff studies and takes positions on proposed legislation affecting education beyond the high school in California. By law, its meetings are open to the public. Requests to speak at a meeting may be made by writing the Commission in advance or by submitting a request before the start of the meeting.

The Commission's day-to-day work is carried out by its staff in Sacramento, under the guidance of its executive director, Kenneth B. O'Brien, who is appointed by the Commission.

The Commission publishes and distributes without charge some 30 to 40 reports each year on major issues confronting California postsecondary education. Recent reports are listed on the back cover.

Further information about the Commission, its meetings, its staff, and its publications may be obtained from the Commission offices at 1020 Twelfth Street, Third Floor, Sacramento, CA 98514-3985; telephone (916) 445-7933.

SURVEY OF SPACE AND UTILIZATION GUIDELINES AND STANDARDS IN THE FIFTY STATES

California Postsecondary Education Commission Report 90-4

ONE of a series of reports published by the Commission as part of its planning and coordinating responsibilities. Additional copies may be obtained without charge from the Publications Office, California Postsecondary Education Commission, Third Floor, 1020 Twelfth Street, Sacramento, California 95814-3985.

Recent reports of the Commission include:

89-21 State Oversight of Postsecondary Education: Three Reports on California's Licensure of Private Institutions and Reliance on Non-Governmental Accreditation [A reprint of Reports 89-13, 89-17, and 89-18] (June 1989)

89-22 Revisions to the Commission's Faculty Salary Methodology for the California State University (June 1989)

89-23 Update of Community College Transfer Student Statistics, 1988-89: The University of California, The California State University, and California's Independent Colleges and Universities (August 1989)

89-24 California College-Going Rates, Fall 1988 Update: The Twelfth in a Series of Reports on New Freshman Enrollments at California's Colleges and Universities by Recent Graduates of California High Schools (September 1989)

89-25 Overseeing the Heart of the Enterprise: The Commission's Thirteenth Annual Report on Program Projection, Approval, and Review Activities, 1987-88 (September 1989)

89-26 Supplemental Report on Academic Salaries, 1988-89: A Report to the Governor and Legislature in Response to Senate Concurrent Resolution No. 51 (1965) and Subsequent Postsecondary Salary Legislation (September 1989)

89-27 Technology and the Future of Education: Directions for Progress. A Report of the California Postsecondary Education Commission's Policy Task Force on Educational Technology (September 1989)

89-28 Funding for the California State University's Statewide Nursing Program: A Report to the Legislature in Response to Supplemental Language to the 1988-89 Budget Act (October 1989)

89-29 First Progress Report on the Effectiveness of Intersegmental Student Preparation Programs: One of Three Reports to the Legislature in Response to Item 6420-0011-001 of the 1988-89 Budget Act (October 1989)

89-30 Evaluation of the Junior MESA Program: A Report to the Legislature in Response to Assembly Bill 610 (Hughes) of 1985 (October 1989)

89-31 Legislation Affecting Higher Education During the First Year of the 1989-90 Session: A Staff Report of the California Postsecondary Education Commission (October 1989)

89-32 California Colleges and Universities, 1990: A Guide to Degree-Granting Institutions and to Their Degree and Certificate Programs (December 1989)

90-1 Higher Education at the Crossroads: Planning for the Twenty-First Century (January 1990)

90-2 Technical Background Papers to *Higher Education at the Crossroads: Planning for the Twenty-First Century* (January 1990)

90-3 A Capacity for Learning: Revising Space and Utilization Standards for California Public Higher Education (January 1990)

90-4 Survey of Space and Utilization Standards and Guidelines in the Fifty States: A Report of MGT Consultants, Inc., Prepared for and Published by the California Postsecondary Education Commission (January 1990)

90-5 Calculation of Base Factors for Comparison Institutions and Study Survey Instruments: Technical Appendix to *Survey of Space and Utilization Standards and Guidelines in the Fifty States*. A Second Report of MGT Consultants, Inc., Prepared for and Published by the California Postsecondary Education Commission (January 1990)

90-6 Final Report, Study of Higher Education Space and Utilization Standards/Guidelines in California: A Third Report of MGT Consultants, Inc., Prepared for and Published by the California Postsecondary Education Commission (January 1990)

90-7 Legislative Priorities of the Commission, 1990: A Report of the California Postsecondary Education Commission (January 1990)

90-8 State Budget Priorities of the Commission, 1990: A Report of the California Postsecondary Education Commission (January 1990)

90-9 Guidelines for Review of Proposed Campuses and Off-Campus Centers: A Revision of the Commission's 1982 *Guidelines and Procedures for Review of New Campuses and Off-Campus Centers* (January 1990)

Survey of Space and Utilization Standards and Guidelines in the Fifty States

Report 90-4